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THESIS

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DETAILED REQUIREMENTS ANALYSIS FOR A MANAGEMENT INFORMATION SYSTEM FOR THE DEPARTMENT OF FAMILY PRACTICE AND COMMUNITY MEDICINE AT SILAS B. HAYS ARMY COMMUNITY HOSPITAL, FORT ORD, CA

by

Elbert T. Shaw, Jr.
and
Joan P. Zimmerman

March 1989

Thesis Advisor Thomas P. Moore

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Personal Author(s) Elbert T. Shaw, Jr., Joan P. Zimmerman

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Detailed Requirements Analysis for a Management Information System for the Department of Family Practice and Community Medicine at Silas B. Hays Army Community Hospital, Fort Ord, CA

by

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Submitted in partial fulfillment
of the requirements for the degree of

MASTER OF SCIENCE IN INFORMATION SYSTEMS

from the

ABSTRACT

This thesis analyzes the current management information systems in place at Silas B. Hays Army Community Hospital with in depth research into the hospital's largest department, the Department of Family Practice and Community Medicine. The findings of the research indicate these systems are not meeting the needs of department managers within the hospital. This thesis contains a requirements analysis for an improved information system for the department. The process of identifying the targeted users, selecting the appropriate development methodology, and identifying the user's information requirements is discussed. The value of the information required by the department manager, both in content and format, is examined. The requirements analysis is based on a combination of systems development life cycle and prototyping methodologies for information systems development and can be used to design, construct, and implement an information system for the targeted department. The requirements analysis can also be used to study the expandability of the proposed information system to departments throughout Silas B. Hays Army Community Hospital.

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I. INTRODUCTION

A. BACKGROUND

Silas B. Hays Army Community Hospital (SBHACH) is a large, full service medical department activity (MEDDAC) providing health care to active duty, retired, and dependent personnel living in and around Fort Ord. The MEDDAC also provides regional medical services to personnel from Hunter Liggett Military Reservation, Presidio of Monterey, Sacramento Army Depot, United States Naval Postgraduate School, and the Sharpe Army Depot. SBHACH's annual operating budget is over seven million dollars and in fiscal year 1988, over 460,000 patients were treated. The hospital consists of 13 major medical departments which provide inpatient and outpatient service, major surgical services, military medical support, and veterinary service. In addition, SBHACH is a teaching hospital for Army doctors and provides occupational health to civilian employees. The goal of SBHACH is to provide its patients with the best medical care possible.

The quality of the medical care provided depends on factors such as the quality of the hospital personnel and the effective use of available resources, e.g. personnel, money, time, and medical supplies. Another factor, the efficient use of resources, indirectly affects the quality of care provided because this factor will determine the continued availability of the resources. One of the biggest obstacles SBHACH faces in trying to reach its goal is the limited resources with which it must operate.

SBHACH doctors and administrators must constantly deal with resource constraints. They are continually searching for more efficient and effective resource management to deal with these constraints while, at the same time, improving the quality of care provided to the patients. In searching for the balance between cost efficiency and quality of care, hospital administrators are turning to information systems, both automated and manual, in the belief that better information will help them operate more cost effectively.

B. PURPOSE

The purpose of this thesis is to study the current management information systems in place at Silas B. Hays Army Community Hospital and determine if these systems are meeting the needs of department managers within the hospital. In identifying the requirements of key department decision makers, we will propose improvements to the information system where the current system fails to meet the department manager's needs. Ultimately, the thesis will provide a design for an information system which will meet the needs of department decision makers more effectively and efficiently than current systems.

C. SCOPE

Due to time limitations, the research did not encompass the entire hospital operation. Therefore, after initial interviews and some detailed study, one department was selected based on its high volume and overall impact on the hospital. The department chosen for the research was the Department of Family Practice and Community Medicine (DFPCM). The DFPCM is one of the 13 major departments

within SBHACH and serves nearly 53 percent of the hospital's patients. An additional motivation for limiting the scope of the research was the increased depth of the analysis and design of an information system that would otherwise be possible.

In addition to the direct study of the DFPCM, it was necessary to conduct research in the many supporting units which influence the department's overall ability to function. The following support divisions were contacted during the course of research:

- Resource Management Division
- Information Management Division
- Clinical Support Division
- Department of Nursing
- Logistics Division
- Personnel Division
- Patient Administration Division

D. METHODS AND ORGANIZATION

The thesis research followed the information systems development life cycle described in the first two sections of Chapter II. Chapter II discusses the theory of information systems and the analysis and design of such systems. The last section of Chapter II introduces the application of information systems to health care. Research was conducted to discover the history, current status, and future of hospital information systems (HISs) and the critical nature of these specialized systems.

The DFPCM organization and functions are described in detail in the first section of Chapter III. Section 2 of Chapter III discusses the results of the current systems

analysis. Data Flow Diagrams (DFDs) are introduced in Chapter III. DFDs diagrammatically portray the current information systems within the DFPCM.

Chapter IV covers the requirements for improving the existing information systems within the DFPCM and how these improvements can be accomplished using an automated information management system. The findings in Chapter IV are a direct result of the analysis conducted in Chapter III and described what is necessary for the information system to meet the needs of the department managers.

The detailed systems requirements analysis is presented in Chapter V, incorporating the functional requirements and alternatives selected in the previous chapters. User Concept Diagrams (UCDs) are introduced in Chapter V to diagrammatically portray the proposed information systems for the DFPCM. The requirements analysis, as described in the chapter, is for the DFPCM alone. This analysis can be used to design and implement a management information system for this department, or with additional study, may be expandable to other clinics within the hospital.

Conclusions and recommendations resulting from this thesis are given in Chapter VI. Chapter VI also suggests directions for further research work.

II. INFORMATION SYSTEMS

A. INTRODUCTION

This chapter introduces the concepts of an information system and the systems development process and discusses the impact of information systems within a hospital environment.

Section B, System Design Concepts, describes the information systems development methodologies used in the thesis to design the information system for the Department of Family Practice and Community Medicine. The process of selecting the most appropriate system development methodology(ies) is also examined.

Section C, Hospital Information Systems (HISs), describes the critical nature of the hospital organization and it's impact on the role of information systems within the hospital environment, both historically and in the near future. Also presented in Section C is a description of the information systems currently used at SBHACH.

B. SYSTEM'S DESIGN CONCEPTS

An information system has been described as a collection of human, computerized, and mechanical agents that work together to acquire, produce, handle, store, use, and disseminate information (Lockeman, 1986, p. 617). Information systems are meant to support the day to day operations, management, and decision making needs of an organization. An effective information system does not necessarily have to be automated. Information systems exist, with or without automation, because workers within the organization require some sort of a system to collect, process, and

exchange the information they need. When automation is deemed necessary and properly designed, it can provide the organization with an increase in both the efficiency and effectiveness of operations. (Whitten, Bently, and Ho, 1986, p. 40)

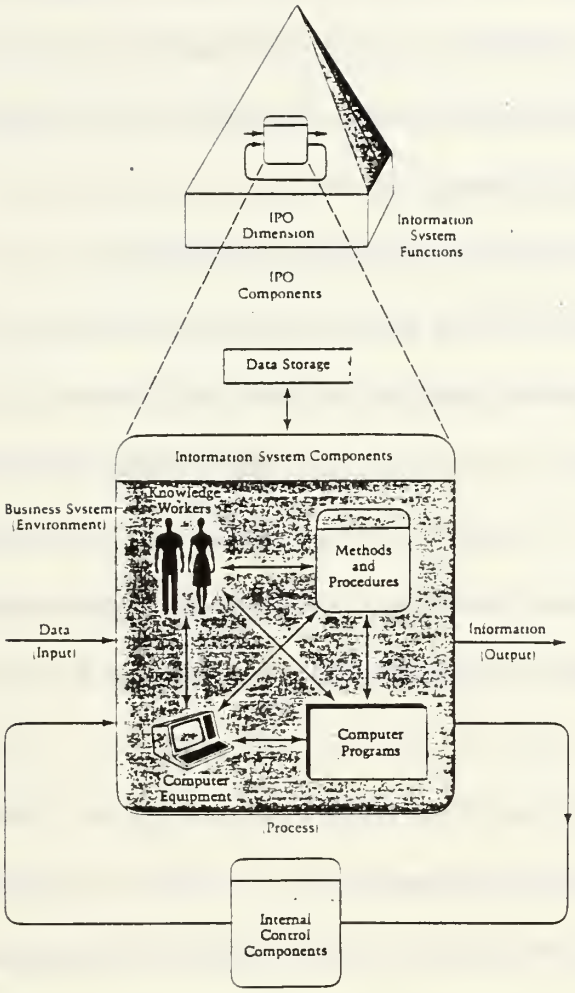
There are four important considerations in the development of an effective information system. First and foremost, the system must be designed to serve the needs of the users. The analyst has a responsibility to provide the user with a product that is both useful and correct. Secondly, the analyst should understand the organization's mission to build the system to effectively support that mission. Thirdly, information systems provide one or more of the three information functions depicted in Table I. The analyst must determine which of these functions the system should support and how the information system will fit within the organization to fulfill those functions. Lastly, the system's components, as depicted in Figure 1, should be designed to harmoniously work together to support the system's intended purpose within the organization. (Whitten, Bently, and Ho, 1986, p. 692) This requires the analyst to systematically analyze the data inputs, data flows, processes, and information outputs. (Kendall and Kendall, 1988, p. 6)

Table I. INFORMATION FUNCTIONS

Data Processing Systems
Processes large amounts of data for routine organization transactions.

Management Information Systems
Provides periodic reports for planning, control and decision making.

Decision Support Systems
Supports decision makers by providing information on demand.



- **Computer equipment or Hardware.** Information systems may include a variety of hardware components, including copiers, calculators, and computer systems.
- **Computer Programs or Software.** A system is a mixture of programs that either control the computer or provide applications to the users.
- **Users (Knowledge workers)** are the most vital part of the information system's components. They are the central theme in any design methodology.
- **Methods and Procedures.** Methods refer to how the system works whereas procedures describe how to perform the job and how to make decisions.
- **Data Storage.** This is a fundamental component of the system. This is the raw data that must be accessed to process into useful information.
- **Internal Controls.** Feedback and control are system concepts that must be added to any system to ensure its proper operation.

Figure 1. Information System Components (Whitten, Bently, and Ho, 1986, p. 692)

Prior to attempting the design of an information system, the systems analyst must choose a design methodology which will best meet his or her needs and the user's needs. This selection process and a description of the methodology used in this thesis is described in the following sections.

1. Systems Development Life Cycle Methodology

System development in the late 1960s[1] was often behind schedule, over budget, expensive, and poorly suited to the users' requirements. As a result, the early system designers developed a set of structured methodologies to make the development process more orderly and manageable. The emergence of structured methodologies provided the analyst with a welcome escape from the haphazard approaches used to develop the requirements, specifications, and programs used in the early design models (Ceri, 1982, p. 208).

As the structured approaches became accepted as a viable systems design alternative, more analysts began to perceive that the structured methodology could even be further improved with the inclusion of a life cycle within the model. This enhanced structured approach, dubbed the Systems Development Life Cycle, was used by these analysts to bring together all of the already proven systems design techniques with the successful project management techniques. This system development life cycle methodology emerged as the most preferred method of all of the system design methodologies. (Wassermann, 1984, p. 44)

---

[1] This continues to be the case in the eighties.

Figure 2 portrays the Systems Development Life Cycle methodology. This approach provided several significant advantages over the non-structured approaches and the early forms of the structured methodologies. This design approach gave the systems analyst a better understanding of the user's requirements while the increasing the user's comprehension and participation in the design process. (Willis, Huston, and d'Ouville, 1988, p. 56) Users also tended to be a lot more satisfied with the final outcome of a system designed using this methodology. Information systems designed using this methodology were also found to be more flexible and maintainable then the early approaches. (Sumner and Sitek, 1986, p. 235)

As Figure 2 shows, the life cycle begins with a project development request. Before a more detailed systems study is started, the systems analyst surveys the problem, opportunity, or directive that initiated the request. This survey is used to determine whether or not significant resources should be committed to the project. If the system development is approved, the development enters the first major phase of the SDLC, the study phase. The goal of the study phase is to educate the analyst about the current system, thus allowing the causes and effects of the problems to be discovered. This type of analysis is presented in Chapter III of this thesis.

The next phase, the requirements phase, is the most critical of the life cycle phases because it provides the foundation for all subsequent phases (Willis, Huston, and d'Ouville, 1988, p. 56). This phase is concerned with the analyst understanding the problems found in the study phase and describing them in terms of the activities, data,

information flows, relationships, and system constraints necessary to solve the problem (Ceri, 1982, p. 205). This type of analysis is presented in Chapters IV and V of this thesis.

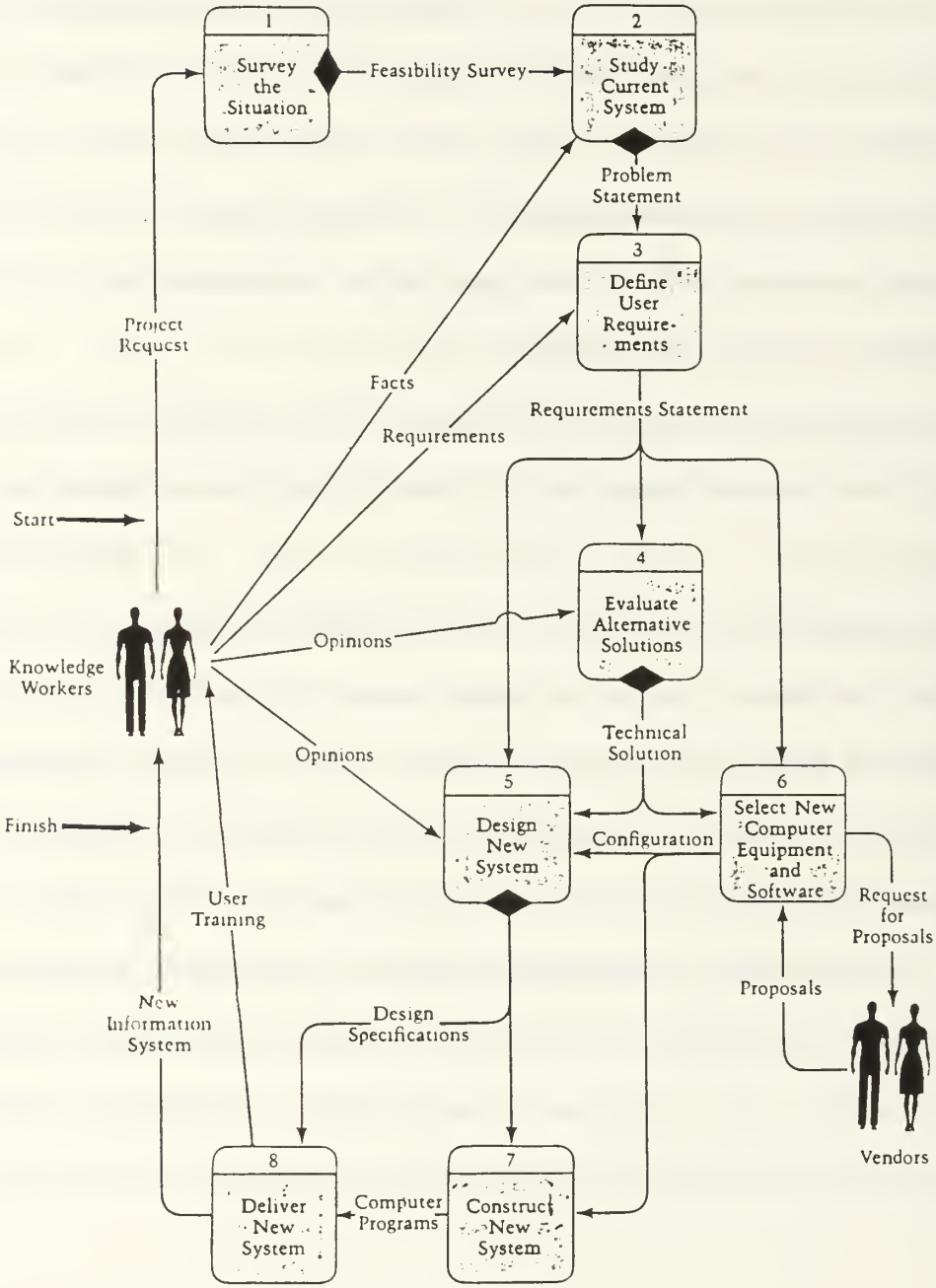


Figure 2. Systems Development Life Cycle.

The evaluation phase looks at how the new system should be developed. The analyst must seek out all possible solutions to the problem and generate a set of alternative proposals to solve the problem. Each alternative is then evaluated on technical, operational, and economic feasibility. The outcome of this phase should be a technically feasible solution. (Whitten, Bently, and Ho, 1986, p. 149)

If this solution calls for new hardware or software, the selection phase becomes necessary. During the selection phase, the analyst determines which system specifications are important for the equipment or software required for the new system. Proposals are then developed and sent to vendors. Once the vendors' proposals are returned, the systems analyst selects the hardware and software configurations that best meets the project's needs at the most reasonable cost. (Whitten, Bently, and Ho, 1986, p. 151)

Given the user requirements, a feasible solution, and the hardware or software configurations from the selection phase, the analyst can now design and construct the information system. Computer outputs are normally designed first, followed by files/databases, and subsequently the user inputs and terminal dialogues. The design phase is where system controls, as implemented in methods and procedures, first enter the developmental life cycle. The deliverable of this phase is the completed design specification and the preliminary procedures necessary for the construction of the new system. The construction and design phases are frequently the most time consuming and tedious phases, particularly if the requirements are incomplete or do not

reflect the actual user's requirements. Finally the system is delivered, the users are trained, and the system enters the maintenance phase. (Whitten, Bently, and Ho, 1986, pp. 151-155)

Throughout the various phases, the analyst is collecting facts, documenting the system, presenting ideas, and reevaluating the feasibility of the system. All of the phases of the system development life cycle are not discreet and distinct phases. Figure 3 illustrates how each phase can overlap within the life cycle. (Whitten, Bently, and Ho, 1986, p. 157) As a life cycle model should indicate, the process will begin again as new project requests are generated, the organization evolves, or the system once again fails to meet the user's requirements.

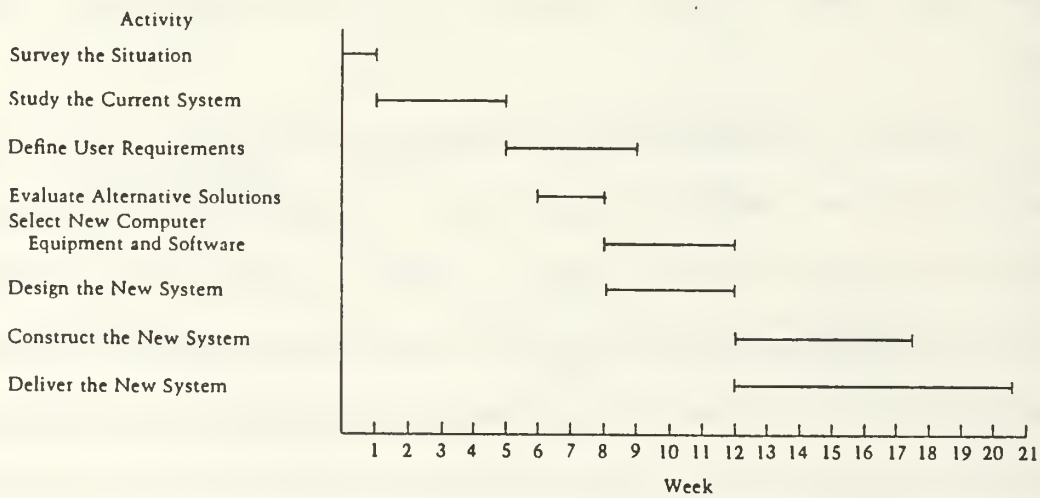


Figure 3. Overlap Opportunities within the Systems Development Life Cycle. (Whitten, Bently, and Ho, 1986, p. 157)

In spite of the large number of structured methodologies available, this type of systems analysis is not widely used (Sumner and Sitek, 1986, p. 235). Today, only about ten percent of the data processing organizations in North America practice

structured techniques in a disciplined fashion even though 90% of the community is at least superficially familiar with the basic concepts (Yourdon, 1986, p. 133).

Prior to selecting the use of one of these methodologies in our thesis, a closer look was taken to determine why these methodologies, so often taught at universities, were not being used. Yourdon explains that there are many reasons for this reversal in the attitudes toward structured analysis. He felt that the primary reason for this reversal was the frustration of analysts over the amount of manual labor required to develop systems using the structured methodologies. Analysts in a real business environment did not have the time to do the time consuming requirements documentation necessary for the requirements analysis when there was a large backlog of projects awaiting development. The analysts also became increasingly frustrated with the inability to apply these methodologies to complex, real-time systems. (Yourdon, 1986, p. 133) Additionally, many systems analysts were not trained in the use of the methodologies and tools and were unsure as to which tools could be effectively used within the phases of the life cycle (Ceri, 1982, p. 208). One of the major reasons for this reversal of attitudes was the development of the prototyping methodologies discussed in the following section. Many analysts were lured away from the structured approaches to systems development by the promise that prototyping could be used to interactively design and progressively tune the systems design without the rigorous requirements of the structured approaches (Ceri, 1982, p. 208).

Too often, even though the structured techniques were used, the end result was a better design that still did not meet the users' needs. Because of the time lag between the analysis and implementation phases in the structured methodology, the

users' environment changed even after the system's requirements were set in the requirements and design phases. The users also had difficulty communicating their requirements to the analyst. Senn points out "users can point to features they like or dislike in an existing system more easily than they can describe them in an imaginary or proposed system." (Senn, 1987, p. 611) These observations led to the conclusion that a better design methodology was needed to meet system development requirements.

2. Prototyping Methodologies

Information systems analysts saw the need for an improved design method. They felt that any systems development approach required the concurrent learning of both the analyst and the users. During the requirements phase, the major functions of the analyst are to help users formalize their tasks and decision processes, ensure that the users learn the analyst's modeling techniques, and help the users understand the scope of the project (Cerveny, 1987, p.98). The structured methodologies simply did not fulfill this requirement. Recent developments in computer technology, primarily the introduction of user friendly code generators, allowed the systems analysts to develop a better approach to the systems development process. This new approach, prototyping, was designed to alleviate some of the problems that concerned the systems analysts about the traditional approaches. (Willis, Huston, and d'Ouville, 1988, p. 57)

The concept of prototyping is not new. In engineering, prototyping has long been a standard for developing and testing new products and systems (Scharer, 1983, p. 60). Prototyping was not designed to replace the systems development life cycle. Instead, prototyping enhances the life cycle by promoting the mutual learning processes between the analyst and user (Cerveny, 1987, p. 98, 103). Prototyping uses the power

of demonstration to enable the user and the analyst to literally see their specification in action (Scharer, 1983, p. 60). Prototyping has the following significant advantages over the traditional structured methodologies:

- Gets the user more actively involved in design and development.
- Provides the user with a tangible means of comprehending and evaluating the proposed system.
- Achieves more meaningful user feedback in terms of their needs and requirements.
- Develops better relationships between systems analysts and user groups.
- Results in fewer post implementation changes, resulting in lower maintenance costs. (Kroenke, 1987, p. 157)
- The system that had been prototyped could be developed in one quarter of the time required of the structured methodologies. (Willis, Huston, and d'Ouville, 1988, p. 58) (Harrison, 1985)

The main benefit of using a prototype methodology is the development of an information system that more closely fits the needs of the organization. Prototyping also reduces the risks involved with the development cycle by getting the system into operation quickly and keeping the system simple. (Cerveny, 1987, p.57) Prototyping is not superior to the traditional methods in all cases. Table II depicts the factors that favor either the traditional or prototype methodologies.

Figure 4 depicts the modified systems development life cycle where prototyping techniques have been integrated into the life cycle. After the users have specified their needs, the analyst can then demonstrate how the proposed system can meet those needs. Design by prototyping consolidates the requirements definition, design, and construction stages of the typical system development life cycle discussed

earlier. These three activities take up approximately 60 percent of the manhours required for a system study. Consequently, prototyping yields a net saving in effort when it is utilized in the design of information systems. (Willis, Huston, and d'Ouville, 1988, p. 58)

Table II. FACTORS FAVORING ALTERNATIVE DEVELOPMENT METHODS (Willis, Huston, and d'Ouville, 1988, p. 58)

Project Characteristics of Alternative Development Methods

Factors Favoring Traditional Systems Development

- Data needs are clearly defined.
- Systems have long life expectancy.
- Tight controls are required.
- Development risks are clearly defined.
- Essential system features are known in advance.
- Operational characteristics are well understood.

Factors Favoring Prototyping

- User requirements are uncertain.
- Procedure changes are extensive.
- User environment is volatile.
- System has relatively short life expectancy.
- System needs to be operational in short period of time.
- Changes in specifications are anticipated.

The construction of a prototype model requires that the systems analyst follow the six basic steps listed in Table III and described below.

Table III. STEPS IN PROTOTYPE DEVELOPMENT (Willis, Huston, and d'Ouville, 1988, p. 57)

Prototyping Design Steps

1. Select an appropriate application.
2. Identify basic needs.
3. Develop the working model.
4. Refine the model and system interface characteristics.
5. Implement revisions and enhancements.
6. Prepare prototype documentation and plan for development.

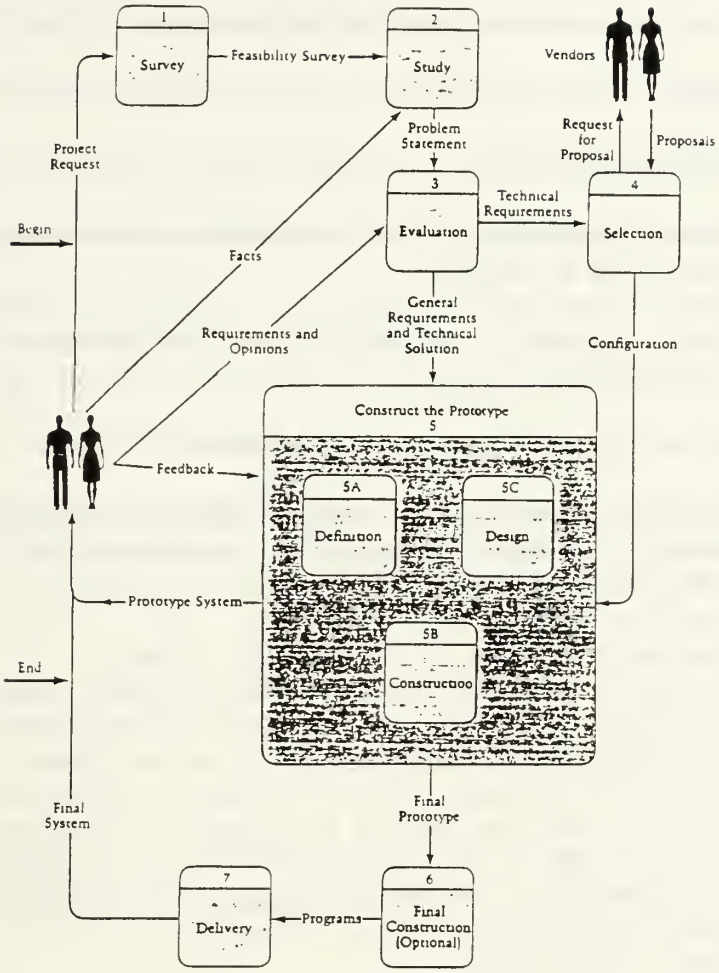


Figure 4. Prototyping Systems Development Life Cycle

a. Step One: Select Appropriate Application

The first consideration for the systems analyst is to determine if the system under development favors the prototyping design methodology. This methodology is not superior to the structured approaches in all cases. The analyst takes into consideration all the factors listed in Table II, Factors Favoring Alternative Development Methods, the user's environment, and the availability of prototyping tools to determine if the system can best be developed with the prototyping approach. (Willis, Huston, and d'Ouville, 1988, p. 58)

The environment within the DFPCM favored the use of prototyping for the following reasons:

- Uncertain user requirements.
- The environment was particularly unstable, subject to wide swings of personnel availability and work procedures.
- The new system is needed immediately to meet the department's expanding role within the hospital.
- The system was expected to have a relatively short life cycle.
- Numerous changes were expected in the specifications, as reports, procedures, and requirements for information appeared to be changing daily.

b. Step Two: Identify Basic Needs

The second step in prototyping involves getting a better understanding of the problem or opportunity that was developed in the study phase. (Willis, Huston, and d'Ouville, 1988, p. 59) The goal of this step is to develop enough of an understanding of the problem to enable the design and construction of the initial prototype model (Boar, 1984, p. 67).

c. Step Three: Develop Working Model

The purpose of this step is to build the initial version of the prototype. Screens and documents layout are defined, data records are specified, and other model characteristics are established (Willis, Huston, and d'Ouville, 1988, p. 59). Content, not presentation, should be the primary goal of this initial model (Boar, 1984, p. 69) The analyst's intent, in this stage, is not to come up with the perfect model but to develop a model that best matches the user's view of the problem. Quality is critical. If the model is incomplete, it results in a poor foundation for the rest of the

development cycle. The target time for delivery of the initial model, depending on the prototype environment, should be three to six weeks. (Boar, 1984, p. 69)

d. Step Four: Refine Model and System Interface Characteristics

In this step, the system is refined so that each of the initial prototypes tested earlier are now required to work together. The analyst's goal in this step is to immediately test new ideas to see what refinements will satisfy the majority of the users. As users review this refined prototype and changes are made, the important changes are documented for later reference. (Willis, Huston, and d'Ouville, 1988, p. 59)

e. Step Five: Implement Revisions and Enhancements

The objective of this step is to allow the users to review the information system in as complete a context as possible. This review occurs after all the changes and enhancements have been implemented and serves as the final evaluation of the information system in the eyes of the user. (Willis, Huston, and d'Ouville, 1988, p. 59) Except for minor problems, the prototype is essentially complete.

f. Step Six: Prepare Prototype Documentation and Plan for Development

This stage of the prototype cycle involves the completion of the documentation for the system and the determination of the fate of the prototype. The format and the extent of the documentation rests largely with the project manager. The final decision is made concerning how the prototype should be used in the new system. At this stage the analyst can go in three directions with the prototype.

- If the implementation of this prototype is too expensive or infeasible, the system can be abandoned.
- Depending on the analyst's prototyping development tools, the prototype could actually be implemented directly.
- As is the case with this thesis, the prototype could be used simply as a step to another stage of the development process. The prototype provides the analyst with a knowledge base for the design of the new system. (Willis, Huston, and d'Ouville, 1988, p. 59)

The successful prototype clearly enhances the traditional approaches. It is usually considerably cheaper, less risky, and conveniently keeps the system simple from the user's perspective. It's primary advantage is that it allows the user to see the application in its operational context and determine if the current design fits his or her needs. (Willis, Huston, and d'Ouville, 1988, p.60)

C. HOSPITAL INFORMATION SYSTEMS (HIS)

1. The Critical Nature of Hospital Information Systems

The health care delivery system in a hospital environment is generally viewed as an industry. This industry has seen major changes in recent decades due to breakthroughs in medicine and technology. The cost of health care nationwide has increased more than tenfold since 1950 to over $120 billion making health care one of this nation's largest industries (Rakich and Darr, 1978, p. 1). In addition to the major changes taking place in the health care industry, the very nature of health care delivery creates a complex organization for the hospital administrator. Rakich and Darr suggest the hospital is one of the most complex organizations in existence based on the characteristics discussed below.

- There is a wide diversity of objectives and goals for different personnel and subsystems (e.g., patient care, education, research, accommodations, administration).
- The diversity of personnel ranges from highly skilled physicians and administrators to unskilled laborers.
- The hospital is in continual operation.
- Hospitals deal with life and death decisions.
- Measuring the major product (patient care) is difficult. (Rakich and Darr, 1978, p. 1)

These often conflicting attributes can cause problems for hospital decision makers. A dichotomy is created by the conflicting goals of the hospital's two components, management and operations, and becomes most evident and important in an environment where societal pressures and legal implications concerning ethical behavior are greatest. The non-medical management component (sometimes referred to as "bean counters") measures efficiency, i.e., the maximum amount of output (hospital services) for a given input (cost). The medical component (health care providers) measures performance by the quality of care provided to the patient (Longest, 1978, p. 125). This difference of purpose and objective will impact the manner in which information is managed and used in the hospital environment. Figure 5 is a humorous portrayal of the conflicts which exist between doctors and administrators when considering the use of computer resources (Covvey and McAlister, 1980, p. 141). However, the consequences of such conflicts are quite serious and play an important role in the potential effectiveness of a hospital information system (HIS).

Another factor influencing the HIS is the complexity of the relationship between the doctor and the patient. The ethics and responsibilities involved make

doctors wary of new technologies and methods unless the benefits to the patients can be proven. (Safir, 1978, p. 98)

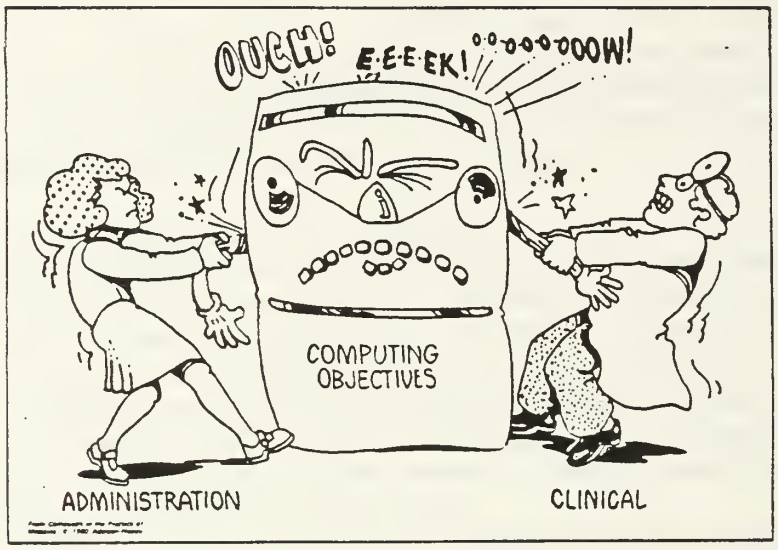


Figure 5. Conflicts

The complexity and significance of health care organizations described in the preceding paragraphs creates a critical environment for a HIS. The conflicts which exist have affected the use and advancement of HISs throughout their life span and continue to influence the way in which hospital personnel view the quality and effectiveness of the HIS. (Safir, 1978, p. 98)

2. HIS Environmental Overview

Early hospital information systems were developed primarily to support hospital administration. Hospitals applied computer resources in conventional ways for accounting and other business related administration. Computers were also used in

medical research but were not generally considered suitable for directly supporting the medical care given to patients.

Figure 6 (Covvey and McAlister, 1980, p. 137) shows three main areas where medical computing can be applied in a hospital environment. The two large circles represent the more traditional applications of computers in health care, administration and research. The intersection of these circles represents the area of medical computing related to the care provided to patients. This area overlaps both medical research computing and administrative computing and is affected by the conflicting objectives of doctors and managers discussed earlier. We targeted this area of medical computing in our research and found a tremendous lag in the computer technology applied to medical care delivery.

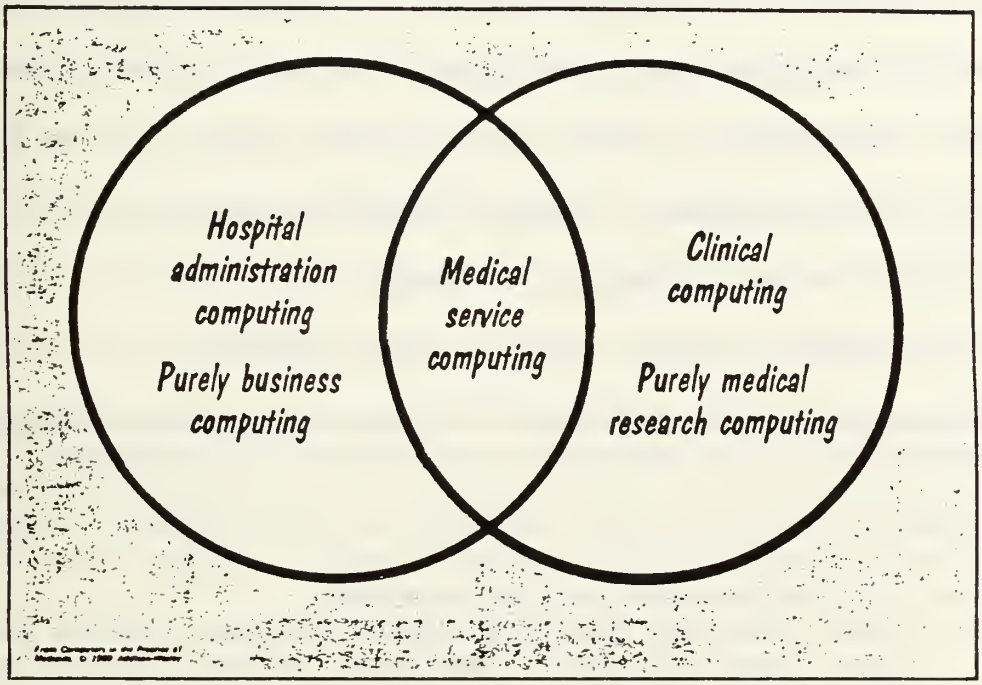


Figure 6. Three Areas of Medical Computing

Experts in both the medical and computer fields began to recognize the medical computing lag in the mid-1970s and have made concerted efforts to catch up. A Symposium on Computer Applications in Medical Care (SCAMC) has met annually since 1976. In 1978, hearings were held before the Subcommittee on Domestic and International Scientific Planning, Analysis and Cooperation to discuss the topic of computers in health care. The reasons for the medical computing lag can be traced back to the critical nature of the HIS introduced in the previous section. In 1978, Aran Safir M.D. wrote:

> ...the complexity that characterizes human interactions is perhaps nowhere better demonstrated than in the relationship of doctor and patient. Representing such complex human interactions effectively within the computer is exceedingly difficult. (Safir, 1978, p. 98).

In 1980, Covvey and McAlister found it was rare for hospitals to devote a portion of its budget to data processing equivalent to that spent by most other industries of comparable size (Covvey and McAlister, 1980, p. vi). The following barriers to medical computing were suggested in 1985 by Bonnie Kaplan, Ph.D. at the annual SCAMC symposium (Kaplan, 1985, p. 400):

- Lack of funding, technology, staffing, training, and effort.
- Poor management including difficulties of interdisciplinary teams, planning and approach, and lack of attention to human factors and methodologies.
- Difficulty of translating medical knowledge into a form suitable for computing.
- Institutional constraints and physician resistance.

These barriers will exist to some degree in every organization. Many hospitals are attempting to hurdle the barriers through improved communication and

cooperation between doctors and administrators. Large hospitals are moving toward a HIS which integrates administrative, research, and medical service computing into one complete system. An example of an integrated HIS is the University Hospital Information System (UHIS), introduced in 1980 when the University Hospital at State University of New York first opened its doors. UHIS offered a wide range of patient care services including registration, medical records, automated lab data, quality control, pharmacy, radiology and nursing (Vegoda and Dyro, 1986, p. 261).

The medical computing future shows a trend toward increased integration of hospital information system functions like that described in the UHIS. The Yale-New Haven Hospital began implementing the Patient Care Support System (PCSS) in 1986. PCSS is expected to take several years to implement. When complete, PCSS is expected to improve the quality of care rendered to patients by allowing physicians to more efficiently and accurately order tests, lab work, and prescriptions. Medical record tracking and results reporting is also expected to improve (Sadock, 1986, p. 114).

The Department of Defense's answer to an integrated HIS is the Composite Health Care System (CHCS) scheduled for completion in 1991. The objectives for CHCS include: "improving the quality of patient care, increasing the efficiency of operations, increasing the accuracy and availability of information, and providing standardized, but flexible support." (Regional Training Conference Manual, 1988, p. 135). In 1988, a Regional Training Conference was held in Monterey, CA to update attending medical professionals on military and other government medical information system initiatives (Regional Training Conference Manual, 1988). One of the topics covered at the conference was the planned implementation of CHCS. The following

patient care benefits of the CHCS were cited (Regional Training Conference Manual, 1988, p. 140):

- Improved quality of care.
- Reduced time spent handling information.
- Improved management control of operations.
- Increased patient satisfaction.
- Increased compliance with standards and regulations.
- Increased service capacity with same staff levels.
- Improved personnel morale and job satisfaction.

Doctors and hospital administrators are trying to recover from the medical computing lag which has continually plagued the industry. They are beginning to realize the importance of quality information for providing high quality patient care. Integrated HISs are the future for medical computing and, if properly used, will enable the health care industry to provide better quality medical care.

3. Information Technology at Silas B. Hays Army Community Hospital

The current information technology at Silas B. Hays Hospital consists of three major systems, the Medical Expense and Performance Reporting System (MEPRS), the Automated Quality of Care Evaluation Support System (AQCESS), and the Computer Stored Ambulatory Record System (COSTARS). These three systems are completely independent and are maintained through separate government contracts. No attempt has been made to link these information systems into one large database. Because of the inherent incompatibility of the systems and the eminent arrival of the Composite Health Care System, SBHACH administrators believe it would be cost

prohibitive to attempt systems integration at this time. The next three sections describe the basic function of each of these systems.

a. MEPRS

The purpose of MEPRS is to collect, process, and report to the Health Services Command (HSC) all data on the medical workload, staffing, and expenses incurred by each workcenter within the hospital (Regional Training Conference, 1988, p. 47). Each hospital department maintains various worksheets to record manpower utilization and workcenter expenses. Each department reports the hours for clinicians (doctors) and non-clinicians (all others) to the MEPRS section, a subdivision of the Resource Management Division (RMD). Also recorded are the inpatient bed days and the number of outpatient visits for each of the workcenters. This workload information is maintained in both the AQCESS and COSTARS systems but because the systems are incompatible, the data must be manually extracted from each of the systems for entry into the MEPRS system. Direct expense data on such items as electricity and water is received from the Fort Ord Finance and Accounting Office and manually extracted by the MEPRS personnel and recalculated based on the square footage of each departments' assigned space. This expense information is then manually entered into the MEPRS computer. Each month all hospital data is loaded onto a magnetic tape and sent to the Health Services Command (HSC) at Fort Sam Houston, Texas. The data is used by the HSC for determining funding allotments for Silas B. Hays. The information maintained in the MEPRS system is not considered useful to the department managers because it is not kept in a format consistent with department resource measures.

b. AQCESS

AQCESS was introduced early in 1986 for all Department of Defense Hospitals. The primary purpose of the system was to provide a standardized method for the collection and reporting of patient and provider information and to assist in quality assurance decision making for all military hospitals. AQCESS was intended to improve the quality of the information provided to administrators, doctors, and quality assurance personnel and to save hospital staff time. Initially implemented with three main modules, AQCESS has since been expanded to six modules. All six modules are in operation at Silas B. Hays:

1. Quality Assurance Module
2. Appointment and Scheduling Module
3. Medical Services Accounts Module
4. Clinical Records Module
5. Registration Module
6. Emergency Services Module

The Appointment and Scheduling Module affects each individual department the most as it determines the daily workload for each doctor in the department.

The AQCESS system is used to capacity. Although ad hoc reports can be obtained by the users of AQCESS, only the system manager in the Information Management Division (IMD) currently uses this function. The system is heavily used during normal working hours for interactive appointment scheduling and clinical records. To help keep system response time low during the day, all AQCESS reports

are generated at night using batch processing. The AQCESS modules produce many reports which show hospital operations and performance in many areas. Statistical reports on workload, productivity, and appointment scheduling histories are just a few of the topics covered.

c. COSTARS

The COSTAR System is unique to the Family Practice Clinic at Silas B. Hays Hospital. This system receives, records, and retrieves administrative and medical information for the active duty families enrolled in the Family Practice Program (Libra Technology, 1982, p. 2). This system was actually a prototype system introduced in 1982 and initially had the five main functions described below:

- **Registration** - This function allows patients to be enrolled in the Family Practice Program.
- **Appointment and Scheduling** - This function allows the COSTARS data entry clerk to book, cancel, or view appointments. It also prints daily schedules and appointment lists and produces a pull list for the medical records department indicating which patients records will be required for the following day's appointments.
- **Medical Records** - This functions maintains a history of a patient examination, including administrative, physical, diagnostic and procedural data.
- **Pharmacy Orders** - This function was intended to provide full pharmacy support by allowing prescription orders to be automatically forwarded to the pharmacy. Records on pharmaceutical history were also to be kept for the patients. Currently, only prescription refills are managed by this system.
- **Laboratory Orders** - This function permits physician orders for lab work to be automatically sent to the lab before the patient arrives. Results are also entered and a daily report is sent to the physician showing the patient and the results of the lab tests ordered for that patient.

Like AQCESS, the COSTARS system maintains a large data base and is capable of producing many reports. COSTARS also accepts ad hoc queries but none

are currently being used. The pharmacy and laboratory functions offer capabilities not found in AQCESS. As with the other major systems, we believe this system is not being exploited to full advantage. This system, and the potential benefits of the data maintained within it, are discussed further in subsequent chapters.

In addition to the three major information systems discussed above, Silas B. Hays makes extensive use of microcomputers for office automation and individual data processing functions. These computers are not currently networked nor is there any standardization of software or procedures.

The current information systems available at Silas B. Hays Hospital are cumbersome and cannot be integrated to provided timely, reliable, and useful information to hospital decision makers. The lack of integration is seen as a major problem by many hospital personnel and, until the CHCS comes on line, stop-gap measures are being used to fill the void and provide the best information available with the limited resources.

The remainder of this thesis describes how one department, the Department of Family Practice and Community Medicine (DFPCM), uses the current information systems available at SBHACH. Also examined is the need for an improved system and how these improvements might be realized through the use of a responsive microcomputer-based information system.

III. CURRENT SYSTEMS ANALYSIS

A. INTRODUCTION

Chapter II introduced information systems development methodologies and the application of information systems within a hospital environment. This chapter describes the current information systems in the Department of Family Practice and Community Medicine, using the development principles discussed in Chapter II. This chapter introduces data flow diagrams as a pictorial way to represent the existing information system and presents data flow diagrams and narrative descriptions for the department's information system.

B. THE DEPARTMENT OF FAMILY PRACTICE AND COMMUNITY MEDICINE

Early in 1988, Health Services Command approved a reorganization for Silas B. Hays Hospital which combined the Department of Family Practice with the Department of Primary Care and Community Medicine, creating the Department of Family Practice and Community Medicine (DFPCM). This new department is the hospitals largest and most diverse in terms of both the services it provides and it's overall affect on the hospital. Figure 7 is the department's organization chart. The department has three general service areas: Family Practice and Residency, Primary Care, and Consolidated Troop and Family Member Services. These are further divided into specialized clinics (sometimes referred to as sections) as shown in the chart. All of these clinics are outpatient oriented and are literally the gateways to all other hospital services (e.g.,

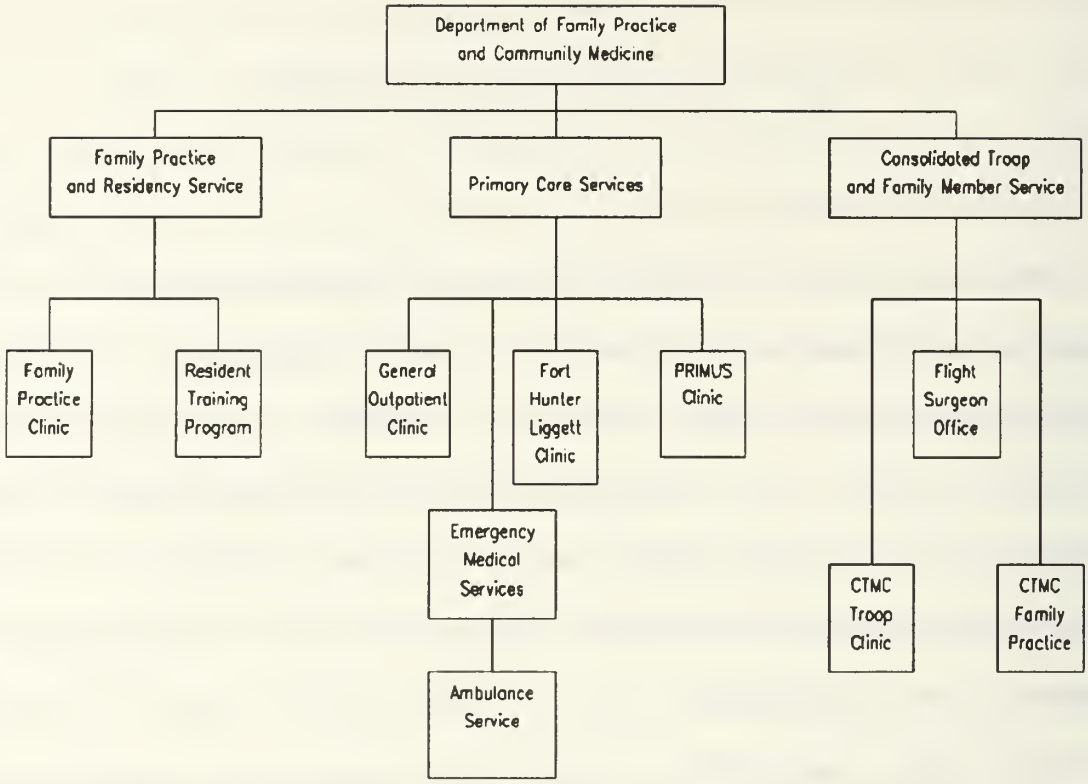


Figure 7. Organizational Chart for DFPCM

pharmacy, lab, and specialized medical departments). The DFPCM affects every aspect of the hospital: every patient treated at Silas B. Hays must first be seen by a doctor working in one of the DFPCM clinics. The mission of the DFPCM, as stated in the Health Services Command Regulation 10-1, is "to provide diagnosis, care, and treatment of all patients commensurate with the highest standards of quality." (HSC Reg 10-1, 1987, p. 3-1) The task of accomplishing this mission is not nearly as simple as the mission statement itself.

The size of the department, the volume of work done, and the impact on overall hospital resources combine to create a highly visible, management challenge. The Chief of the DFPCM (currently a Lieutenant Colonel) is responsible for meeting this

challenge. The resources he commands include over 150 people and an annual budget of nearly half a million dollars. In addition, there are five separate service locations, one of which is 100 miles from the main hospital (Fort Hunter Liggett). Unfortunately, these resources are limited compared with the task at hand. Since his time is extremely valuable, the information he gets should be summary in nature in order that he not be overwhelmed with meaningless data, and yet at the same time, complete enough to allow him to make informed, confident decisions. All of these factors must be considered when designing an information system for use by the Chief of the DFPCM.

Initial interviews with the Department Chief allowed us to identify those management areas which demand the greatest attention and for which he requires the best possible information. These areas fell into the following seven broad categories:

- Fiscal Resources.
- Material Resources.
- Personnel and Scheduling.
- Productivity.
- Patient Satisfaction.
- Medical Procedure Suspense Information.
- Patient Check-In and Records Procedures.

The last two areas were determined to be beyond the scope of this thesis because of time constraints and the inherent size and complexity of the projects themselves.

The Department Chief agreed with our decision and prioritized the remaining five areas as shown below:

- Fiscal Resources.
- Material Resources.
- Personnel and Scheduling.
- Patient Satisfaction.
- Productivity.

The remainder of this thesis describes the research into each of these areas and the requirements for an information system which would serve the Department Chief in making management decisions concerning these key areas.

The five major areas listed above were divided into the following six specific systems:

- Budget System.
- Equipment System.
- Personnel System.
- Scheduling System.
- Patient Satisfaction System.
- Productivity System.

The following section describes the six existing information systems listed above (with diagrams and written narrative) and how information is gathered, stored, and presented for decision making. As described in Chapter II, the current system should be well understood before any attempt is made to improve any part of it. Subsequent

chapters discuss where and why improvements are needed and how those improvements can be achieved through system redesign and automation.

C. DATA FLOW DIAGRAMS

In the preliminary description of the information system within the DFPCM, we used Data Flow Diagrams (DFDs) to represent the current system to department personnel. The Data Flow Diagram enables the designer to describe the existing system or the proposed new system at a logical level without considering the physical environment in which the data flows (e.g., telephone calls, mail, etc.) or the physical environment in which the data is stored (e.g., card file, microfiche, disk, floppy disk, or tape). (Atkas, 1987, p. 57) The DFD describes the system as a network of processes (subsystems) connected to each other and/or to data stores, sources and sinks. (Atkas, 1987, p. 58) The basic symbols used in the DFD's are described below.

- **Data Flow.** An arrow is used to represent either the flow of information or objects. Occurrences of the data flow must contain data.

- **Process.** A rounded rectangle represents a process. Processes are work performed by people, machines, or computers on incoming data flows to produce outgoing data flows. (Whitten, Bently, and Ho, 1986, p. 226)

- **External Entity or Boundary.** A square is used to represent an area in which data originates or terminates. In essence, the sources and sinks define the boundaries of the system.

- **Data Store.** An open-ended rectangle represents a store of information or objects, irrespective of the storage medium. (Atkas, 1987, p. 59)

The components of the information system correspond to the DFD symbols as follows (Whitten, Bently, and Ho, 1986, p. 234):

Information System Component	DFD Symbol
Data (Input)	Data Flow
Information (Output)	Data Flow Users
Entity/Process	Methods/Procedures
Process Data Storage	Data Store
Computer Equipment	Process/Data Store
Computer Programs	Process

To achieve clarity, DFD's are prepared at several levels. The highest level DFD is the "context diagram," which merely shows the boundaries of the system under study. The processes are further decomposed as necessary into lower level diagrams. (Atkas, 1987, p. 68). The following sections use DFD's to illustrate the six current information systems.

1. Budget System (see DFD, Figure 8).

The Resource Management Division (RMD) receives the hospital's budget from the Health Services Command on an annual basis via the MED 304 report. RMD divides this budget into quarterly budget targets for each department and distributes the budget allocations at the beginning of each quarter. The department Non-commissioned Officer in Charge (NCOIC) (currently a Master Sergeant) is the principle administrator of all incoming budgetary information. He serves both as the Department Chief's budget administrator and the clinics central point of contact on all

budgetary matters. This practice of using the NCOIC as the monitor appears to be common practice throughout the hospital.

Once the department's budget is received from RMD it is allocated by the NCOIC into 16 separate accounts. The 16 budget accounts reflect the current organizational structure with a few exceptions required by funding needs. The 16 sections are listed below:

- **Primary Care.** This is an overall budget category for any department wide requirements.
- **Family Practice Clinic.** This is the eighth floor Family Practice clinic at the hospital.
- **CTMC-Family Practice.** This is the Family Practice clinic operated at the CTMC.
- **Emergency Medical Services.** This is the emergency room excluding the ambulance section requirements.
- **Ambulance Section.** Supply budget for the ambulance section which is a subsection of the emergency room.
- **Flight Surgeon Office.**
- **General Outpatient Clinic.** Serves walk-in patients and active duty sick call in the Hospital.
- **Presidio of Monterey-Health Clinic.** Though the POM clinic is run by PRIMUS, the department assigns a doctor as liaison to handle sickcall and official military matters for which it receives department funds.
- **Consolidated Troop Medical Clinic (CTMC).** Medical care for 7th Light Infantry Division personnel.
- **Battalion Aid Station.** This money is provided to the Division Medical Supply Office to reimburse medical supplies used by the battalion aid stations throughout the division.
- **Fort Hunter Liggett Clinic.**

- **CTMC (Pathology).** Funds in this category pay for supplies needed by the pathology section located at the CTMC.

- **CTMC (Radiology).** Funds in this category pay for supplies needed by the X-Ray section at the CTMC.

- **CTMC (Pharmacy).** Funds in this category pay for supplies needed by the Pharmacy Section at the CTMC.

- **CTMC (Immunization).** Funds in this category pay for immunization supplies for the CTMC.

- **Battalion Aid Station (Immunization).** Funds in this category pay for immunization supplies used by the battalion aid stations.

Each section prepares requisitions and monitors its expenditures in its own Document Control/Funds Control register (DC/FC). This document serves as a record for items ordered and an indicator of the account's remaining funds once the supplies are received. The DC/FC register is currently maintained manually in each clinic's supply section. One important location for the expenditure of supply dollars is the Self Service Supply Center (SSSC). The SSSC is a self service supply point for certain office, medical and computer supplies. These supplies are charged against the individual section's account and are usually recorded on a weekly recap basis by an entry into the DC/FC register. These expenditures are reconciled on a weekly basis with the Detailed Obligation Report (DOR). This report confirms correct obligation amounts and recorded orders. Four copies of the DOR are received weekly from RMD in microfiche form. The four copies are distributed to the CTMC, Fort Hunter Liggett clinic, the main Family Practice clinic, and the department NCOIC. There are a limited amount of DOR's available, so every section cannot receive it's own copy. This shortage is caused by a number of microfiches actually delivered to RMD.

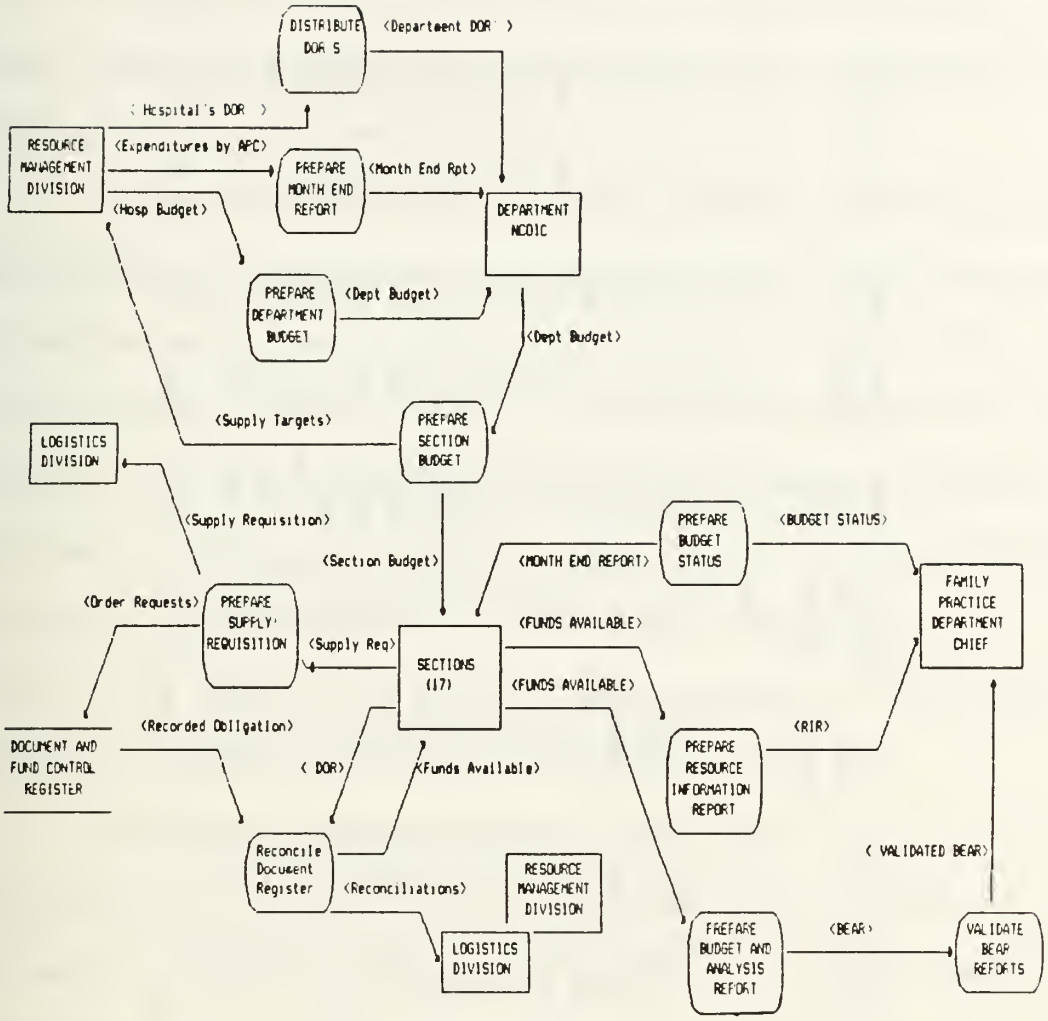


Figure 8. Budget System Data Flow Diagram

The NCOIC provides the Department Chief with budget information via the department Budget Status Report (see Figure 9). This report is prepared at the beginning of the quarter, at the beginning of each month, and on a recap basis at the end of each quarter and the Fiscal Year. The Budget Status Report is the department's principle source of information on current budget and expenditure status for each of the 16 accounts. The report is currently generated using a LOTUS 1-2-3 spreadsheet program maintained by the NCOIC. The spreadsheet printout shows expenditures by

Figure 9. Department Budget Status Report

APC OCT 88	SECTION	ALLOCATED FUNDS FOR QTR (1ST)	SUPPLY NON-MEDICAL	EXPENSES MEDICAL	TOTAL	TOTAL SPENT THIS QTR	UNCOMMITTED FUNDS THIS QTR	FUNDS PER MONTH	% SPENT MONTH	% SAVED MONTH	% SPENT QTR	% SAVED QTR
W-140	PRIMARY CARE	1000	39.4	0	39.4	39.4	960.6	333.33	0.12	0.88	0.04	0.96
W-145	C, FAM PRAC.	8000	0	0	0	0	8000	2666.66	0.00	1.00	0.00	1.00
W-357	FAM PRAC CL.	14000	296.54	9563.63	9860.17	9860.17	4139.83	4666.66	2.11	-1.11	0.70	0.30
W-358	CTMC-FPC	10000	332.66	781.8	1114.46	1114.46	8885.54	3333.33	0.33	0.67	0.11	0.89
W-360	EMS	25000	146.83	5857.15	6003.98	6003.98	18996.02	8333.33	0.72	0.28	0.24	0.76
W-361	FSO	2200	185.53	186.55	372.08	372.08	1827.92	733.33	0.51	0.49	0.17	0.83
W-368	GOC	12000	193.04	4378.36	4571.4	4571.4	7428.6	4000	1.14	-0.14	0.38	0.62
W-370	POM-HC	500	0	214.02	214.02	214.02	285.98	166.66	1.28	-0.28	0.43	0.57
W-371	CTMC	2000	214.93	1727.33	1942.26	1942.26	57.74	666.66	2.91	-1.91	0.97	0.03
W-376	Bn Aid Sta.	7000	0	1741.79	1741.79	1741.79	5258.21	2333.33	0.75	0.25	0.25	0.75
W-378	FHL-HC	2500	134.95	652.67	787.62	787.62	1712.38	833.33	0.95	0.05	0.32	0.68
W-415	CTMC (Path)	1000	0	125.25	125.25	125.25	874.75	333.33	0.38	0.62	0.13	0.87
W-425	CTMC (Rad)	6500	0	3552.3	3552.3	3552.3	2947.7	2166.66	1.64	-0.64	0.55	0.45
W-445	CTMC (Pharm)	23000	0	10733.76	10733.76	10733.76	12266.24	7666.66	1.40	-0.40	0.47	0.53
W-925	AMB SVC	1500	22.91	24.6	47.51	47.51	1452.49	500	0.10	0.90	0.03	0.97
W-940	CTMC (Immu)	5000	0	700.55	700.55	700.55	4299.45	1666.66	0.42	0.58	0.14	0.86
W-941	Bn Aid (Immu)	3000	0	722.73	722.73	722.73	2277.27	1000	0.72	0.28	0.24	0.76
	DEPT TOTALS	124200	1566.79	40962.49	42529.28	42529.28	81670.72	41400	1.03	-0.03	0.34	0.66

section, their uncommitted funds and appropriate percentages of expenditures for the reporting period. The printout is given to the Chief monthly and maintained by the NCOIC in a file on a microcomputer disk.

Monthly, the NCOIC receives a month-end report from RMD that reflects the expenditures by medical and non-medical categories for each of his separate clinics. The month-end report is used to update the Budget Status Report for review by the Department Chief and the section chiefs. The principle problem with this system concerns the end of year constraints. As the end of the year approaches, the expenditure of funds becomes crucial. The amount that is reflected in the month-end report may be several obligations behind the actual expenditures recorded in the section's DC/FC register. This requires a direct matching of available funds by monitoring the sections through telephonic expenditure reports.

Quarterly, the Resource Information Report is generated to be used in a meeting between the Department Chief and his section chiefs (see Figure 10). This report serves as the agenda for the meeting. The primary topic in this meeting is the projected budget shortfalls for the quarter based on unforeseen requirements.

On an as needed basis, the Budget and Equipment Analysis and Review report (the BEAR) is requested from the section chiefs. This report reflects much the same budget information contained in the Resource Information Report but includes important information on the status of critical department equipment such as replacement or maintenance requirements (discussed below). The BEAR is collected by the NCOIC for comments and delivered to the Chief for his review.

The OIC/NCOIC of all services/clinics will report to the Chief, Department of Family Practice and Community Medicine on the following items:

1. PERSONNEL:

   a. Officers AUTH____ ASGN____ SHORT____ PROJ LOSS____

   b. Enlisted AUTH____ ASGN____ SHORT____ PROJ LOSS____

   c. Civilian AUTH____ ASGN____ SHORT____ PROJ LOSS____

2. BUDGET:

   a. Allocated for Quarter $ _____

   b. Spent in ____ Quarter $ _____

   c. Uncommitted Funds $ _____

   d. Projected Shortfalls $ _____

3. EQUIPMENT STATUS:

   a. Old Equipment Status:

      (1) _____

      (2) _____

      (3) _____

   b. New Equipment Status:

      (1) _____

      (2) _____

      (3) _____

   c. MEDCASE ITEMS (Equipment needed):

      (1) _____

      (2) _____

   d. CEEP ITEMS (Equipment needed):

      (1) _____

      (2) _____

2

The OIC/NCOIC will report to the Chief, Department of Family Practice and Community Medicine on the following items:

1. List three (3) things that are going well.

   a. _____

   b. _____

   c. _____

2. List three (3) things being worked on:

   a. _____

   b. _____

   c. _____

3. List any and all items and/or issues that you require the assistance of the C, DFP/CM.

   a. _____

   b. _____

   c. _____

   d. _____

   e. _____

Figure 10. Resource Information Report (RIR)

2. Equipment Procurement System (see DFD, Figure 11).

The equipment requirements for the department are interrelated with the budget system described above in that all expenditures for equipment must be budgeted and tracked within that system. The department's equipment needs occur in the four areas listed below:

- **Durable Equipment.** This includes low cost, less than $1000, equipment that is used on a day to day basis. This equipment is funded through the normal supply budget.
- **Capital Expense Equipment Program (CEEP).** Medical equipment that costs more than $1000 but less than $5000. The budget for this equipment is maintained by RMD.
- **Medical Care Support Equipment (MEDCASE).** Equipment that costs more than $5000. This budget is maintained by RMD.
- **Computer/Electronic Equipment.** Although the cost of this equipment is taken out of the department's budget, the approval to order it comes from outside the department (discussed below).

The primary source of equipment authorizations is the Table of Distribution and Allowances (TDA) which shows the equipment authorized to be procured and held by each department section. Special medical equipment not included in the TDA must be specifically identified and requested by the department.

Each section identify their equipment requirements by determining equipment authorization levels, the equipment currently on hand, the status of equipment on order, and the equipment that requires replacement. The sections have numerous sources they can use to determine the status of their equipment. The Logistics Division's Property Management Branch maintains property records for all equipment held by each section. They also produce reports on the status of equipment on order, the useful life of

equipment on hand, and the number of years the equipment has been extended over its defined useful life. The Medical Maintenance Division maintains cumulative status reports on the maintenance performed on all medical equipment along with the one-time expenditure limit which defines the maximum limit for future repair costs for each equipment item. This information is critical in determining if a piece of equipment has exceeded its allowed maintenance expense.

The problem with all of these reports is their relative inaccessibility to the sections. The reports are not distributed to the sections and the maintenance reports are maintained in the Medical Maintenance building, separate from the hospital. Because of these difficulties, not all sections attempt to obtain this information. Another major factor affecting the availability of this information is that the reports are not divided into sections or departments but maintained on a hospital-wide basis.

Often, equipment needs are not identified until failure of the old equipment. The Department Chief and NCOIC recently created the Budget and Equipment Analysis Report (BEAR) to help them plan for equipment expenditures and better manage their equipment budget (see Figure 12). This report will be completed by each section on an annual basis to identify critical equipment needs. The BEAR report not only identifies critical needs but was intended to promote interest in identifying those needs in a more timely manner. The sections must identify their replacement requirements for the upcoming fiscal year and for four subsequent years. he sections also report the requirements for CEEP and MEDCASE items, along with the status of equipment on order.

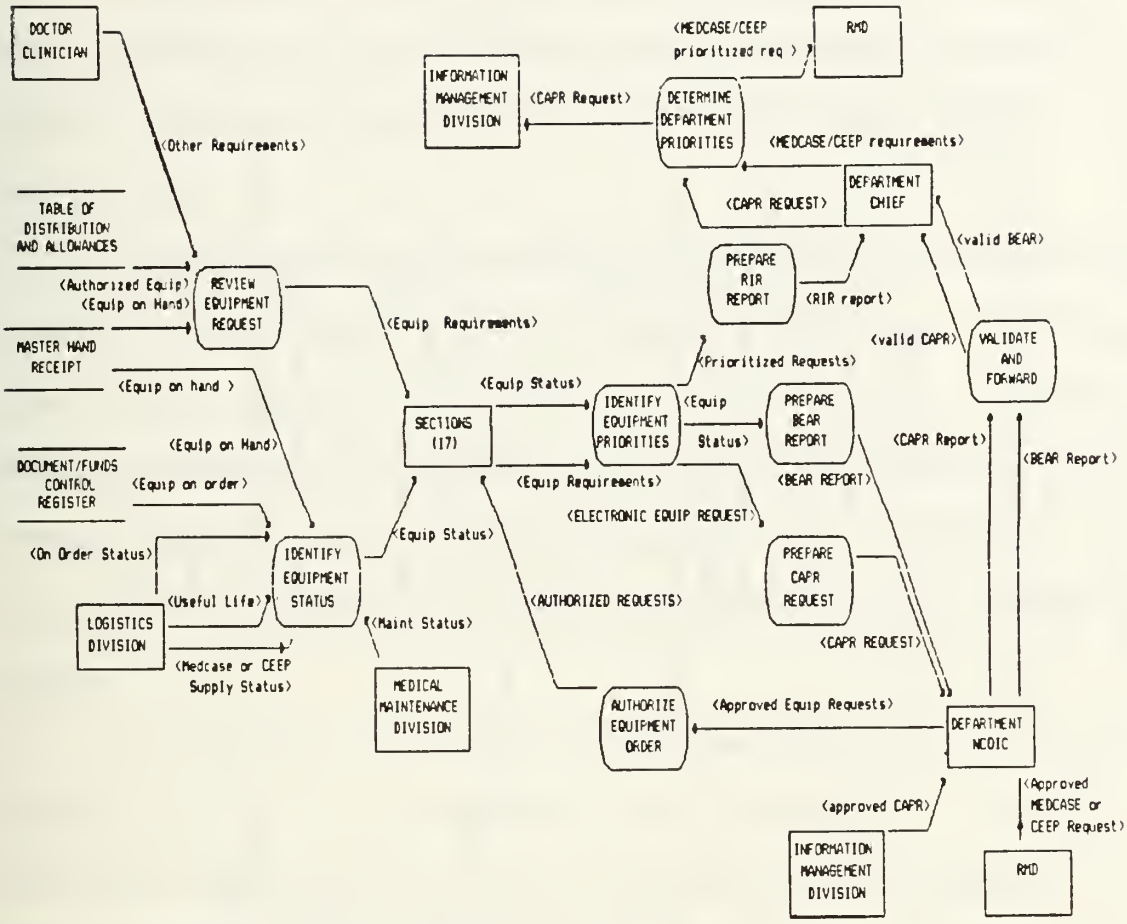


Figure 11. Equipment System Data Flow Diagram

Once the section's requirements are identified with the BEAR, the Department Chief, in conjunction with his service chiefs, determines the priorities for the department. The appropriate paperwork is completed and forwarded to the RMD Logistics Division to await the next hospital wide Program and Budgeting Advisory Committee (PBAC). The PBAC consists of key hospital personnel who review and prioritize MEDCASE and CEEP requirements for each department. If approved, these items go onto a list of prioritized and approved equipment, either MEDCASE or CEEP, and await the availability of funds.

_____
(SERVICE/CLINIC/SECTION)

8: 20 JAN 89

BUDGET AND EQUIPMENT ANALYSIS & REVIEW

1. MONEY ALLOCATED FOR EACH QUARTER $ _____ AND FY $ _____.
2. MONEY SPENT EACH QUARTER $ _____ AND FY $ _____.
3. MONEY SAVED EACH QUARTER $ _____ AND FY $ _____.
4. MONEY SHORTFALL EACH QUARTER $ _____ AND FY $ _____.
5. EQUIPMENT STATUS.
6. EQUIPMENT NEEDING TO BE REPLACED NOW (FY - 89).
   A. _____.
   B. _____.
7. MONEY NEEDED FOR EQUIPMENT REPLACEMENT NOW $ _____ (TOTAL).
   (7A + 7B)
   A. $ _____ (ITEM 6A).
   B. $ _____ (ITEM 6B).
8. EQUIPMENT NEEDING TO BE REPLACED IN ONE (1) YEAR (FY - 90).
   A. _____.
   B. _____.
9. MONEY NEEDED FOR EQUIPMENT REPLACEMENT IN ONE (1) YEAR $ _____ (TOTAL).
   (9A + 9B)
   A. $ _____ (ITEM 8A).
   B. $ _____ (ITEM 8B).
10. EQUIPMENT NEEDING TO BE REPLACED IN TWO (2) YEARS (FY - 91).
   A. _____.
   B. _____.
11. MONEY NEEDED FOR EQUIPMENT REPLACEMENT IN TWO (2) YEARS $ _____ (TOTAL).
   (11A + 11B)
   A. $ _____ (ITEM 10A).
   B. $ _____ (ITEM 10B).

1

12. EQUIPMENT NEEDING TO BE REPLACED IN THREE (3) YEARS (FY - 92).
   A. _____.
   B. _____.
13. MONEY NEEDED FOR EQUIPMENT REPLACEMENT IN THREE (3) YEARS $ _____ (TOTAL).
   (13A + 13B)
   A. $ _____ (ITEM 12A).
   B. $ _____ (ITEM 12B).
14. ACTUAL APPROVED ITEMS ON CEEP PROGRAM NOW:
   A. _____ PRIORITY # ____ $ _____.
      (1) DATE ITEM ORDERED OR TO BE ORDERED _____.
      (2) PROJECTED ARRIVAL DATE OF ITEM _____.
   B. _____ PRIORITY # ____ $ _____.
      (1) DATE ITEM ORDERED OR TO BE ORDERED _____.
      (2) PROJECTED ARRIVAL DATE OF ITEM _____.
15. PAPER WORK IN PROGRESS FOR PLACING EQUIPMENT ON CEEP PROGRAM.
   A. _____ $ _____.
      (1) STATUS: _____.
   B. _____ $ _____.
      (2) STATUS: _____.
16. ACTUAL APPROVED ITEMS ON MEDCASE PROGRAM NOW:
   A. _____ PRIORITY # ____ $ _____.
      (1) DATE ITEM ORDERED OR TO BE ORDERED _____.
      (2) PROJECTED ARRIVAL DATE OF ITEM _____.
   B. _____ PRIORITY # ____ $ _____.
      (1) DATE ITEM ORDERED OR TO BE ORDERED _____.
      (2) PROJECTED ARRIVAL DATE OF ITEM _____.
17. PAPER WORK IN PROGRESS FOR PLACING EQUIPMENT ON MEDCASE PROGRAM.
   A. _____ $ _____.
      (1) STATUS: _____.
   B. _____ $ _____.
      (2) STATUS: _____.

2

Figure 12. Budget and Equipment Analysis Report (BEAR)

Currently, there is no consolidated list of the department's needs but each section maintains its own list. The only source of consolidated information on equipment needs are the quarterly Resource Information Reports, discussed in the previous section.

Needs for electronic and communications equipment are separately identified by each section on an Information Capability Request (CAPR). Once the CAPRs are approved by the Department Chief, they must be countersigned by the Chief, Information Management Division, the Deputy Commander for Clinical Services, and eventually by the Directorate of Information Management for Fort Ord (DOIM). Once approved, it is the responsibility of the department to obtain the funds and order the equipment.

The Department Chief needs all of this information to plan for equipment expenditures. He can use the information provided by his sections to plead his case to the hospital administrators who allocate the funding dollars for his department. The "out year" information provides him with a projection of future equipment needs and helps improve the department budgets.

3. Personnel System (see DFDs, Figures 13 and 14)

The DFPCM employs more than 150 people. To effectively manage these people, the Department Chief requires personnel information in three main areas: authorized positions and vacancies, educational travel funding requirements, and personnel leave and temporary duty requests.

Each department in the hospital is authorized a certain number of people, by position, based on the Table of Distribution and Allowances (TDA). The Department NCOIC uses a word processing program to keep a list of all authorized positions, both filled and vacant, for the DFPCM. This list contains appropriate TDA line numbers and position descriptions plus the personal data for all assigned persons (or a "vacant" indication if the position is unfilled). On an as-needed basis, the NCOIC prints the personnel position list for each section. Each section NCOIC, if necessary, updates his list and returns it to the Department NCOIC who then updates the master roster. The updated master roster is forwarded to the Department Chief and is also sent to the MEPRS section to update their Position Control Roster.

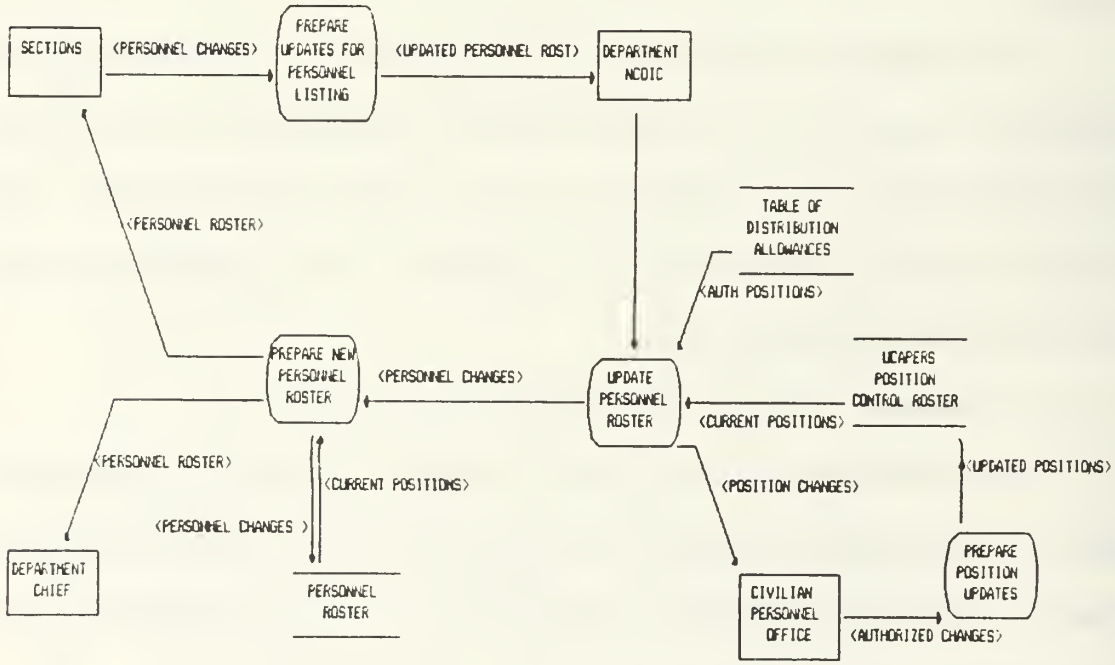


Figure 13. Personnel System Data Flow Diagram

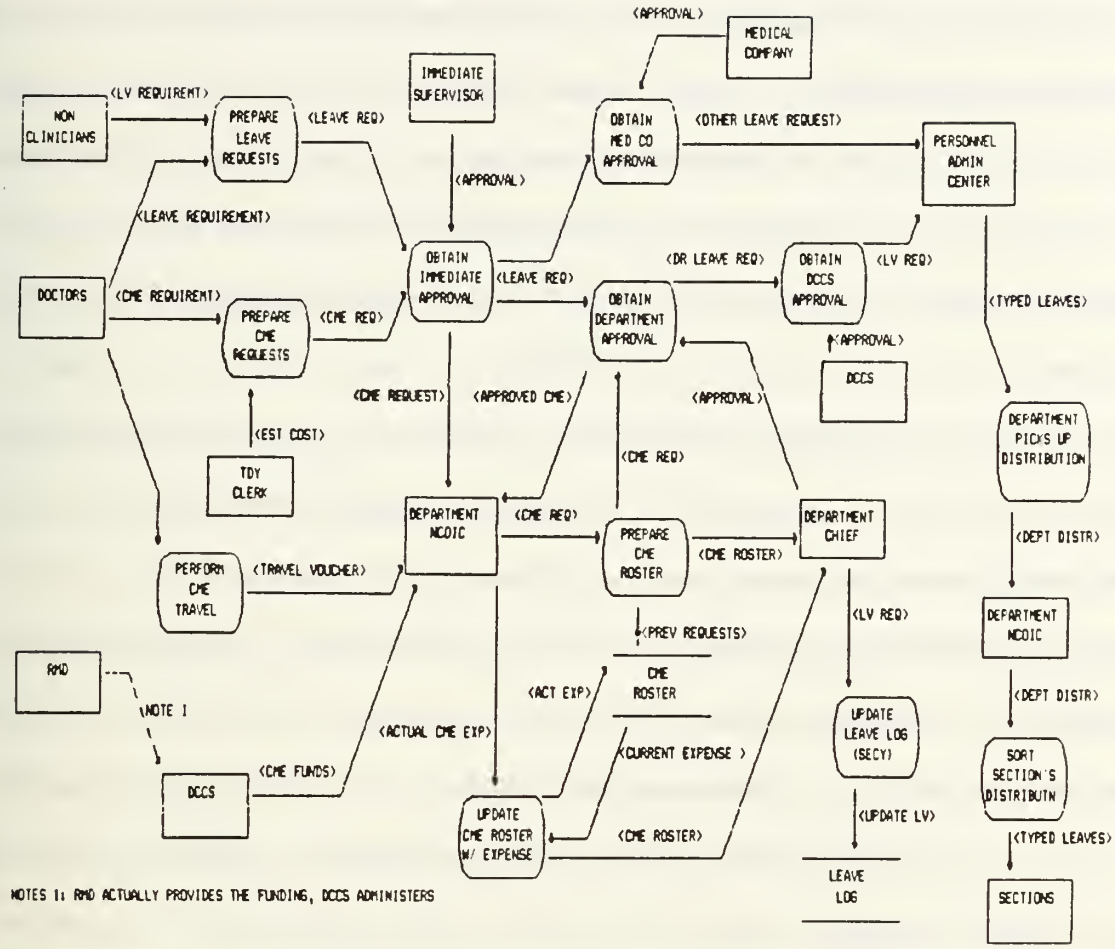


Figure 14. Leave and TDY Absence Data Flow Diagram

The Continuing Medical Education (CME) program provides the doctors within the hospital the necessary funds for continuing their medical education. Each doctor determines his or her educational needs and prepares a CME request which includes the estimated cost of travel. These requests are reconciled with the department's allocated CME funds and if sufficient funds are available, the request is approved by the Department Chief and forwarded to the Deputy Commander for Clinical Support (DCCS) for approval. The DCCS publishes a master list of doctors approved for CME travel. The NCOIC requires each doctor who has completed his

or her CME travel to provide a copy of the travel claim voucher. Through this information, the NCOIC can capture actual CME costs well before they are reported by the travel personnel at finance (which can be one to three months after the travel). The CME funds are managed closely because actual costs often exceed the estimates originally stated in the request. The CME funds are maintained separately from supply funds.

The Department Chief expressed a desire to monitor leave and temporary duty (TDY) status. Leave and TDY information is collected in two separate methods depending on the person involved (see Figure 14). Doctors send leave and TDY requests to the Department Chief, via their chain of command. Requests approved by the Chief are recorded in a journal kept by the department administration section and forwarded to the DCCS. The doctor must also notify the Assistant Department Chief (ADC) of any planned absences for scheduling purposes (see Figure 9, Scheduling). The hospital Personnel Administration Center (PAC) types approved requests on a Department of the Army (DA) Form 31. This form is routed through the hospital distribution system to the NCOIC who distributes it to the doctor's respective section. Other personnel leave and TDY requests are routed through the Medical Company chain of command. After approval by the Medical Company First Sergeant and Commander, these requests are forwarded to the PAC, typed on a DA Form 31, and distributed via the department NCOIC to the appropriate section.

The Department Chief's main concern in managing personnel is planning for position vacancies and temporary absences due to leave and TDY. Presently, section chiefs report upcoming losses on an exception basis only, primarily when the position

involved is critical to section operations. The PAC has the capability to report military personnel losses on a 30, 60, 90, 120, 150, 180, 270, and 300 day basis, but this information is available only on a hospital-wide basis.

4. Scheduling System (see DFDs, Figures 15 and 16)

The Department Chief's primary concern for scheduling lies in two clinics, the Family Practice clinic and the CTMC/FP clinic. Figures 15 and 16 show the doctor scheduling process as it currently exists in each of these clinics, respectively.

a. Family Practice Scheduling

The Family Practice scheduling system involves two primary schedules, the On-Call Schedule and the Clinic Schedule, and a secondary schedule, the Walk-In Schedule. The Assistant Department Chief (ADC) creates each of these schedules. This process is very subjective and difficult to define precisely. Each of the following sections describes the process for each of the schedules discussed above.

(1) On-Call Schedule. The On-Call Schedule establishes which doctor will be on-call for each night of the month. The On-Call Schedule affects every clinic within the department except the Emergency Medical Services which have their own on-call schedule. To create this schedule, the Assistant Department Chief (ADC) maintains several different files which help him determine which doctor to schedule for each day.

Every clinic has a minimum number of doctors which are required to be on duty each day. This information is maintained on a sheet of paper in the ADC's scheduling folder and is necessary for creating the On-Call Schedule because a doctor who is on-call one day will not be available for duty the following day. The

ADC also maintains historical data for each doctor showing the number of times the doctor has been on call on holidays and weekends. The ADC keeps 3" x 5" cards with special requirements for each doctor such as continuing education, or conference dates for which the doctor would be unavailable for on-call duty. The doctors must also inform the ADC when they are requesting leave or when they will be away on temporary duty (TDY). The last information kept by the ADC is a cumulative monthly tally of the number of times each doctor has stood on-call duty for the last calendar year. After considering all of this information, the ADC creates the On-Call Schedule in a manner which will be fair to all of the doctors and yet fill the requirements for on-call duty and the following day's clinic schedule. The on-call schedule is distributed to each doctor, the patient care nursing stations on each ward, the emergency room, and the Clinical Support Division. In addition, the on-call schedule is used to create the clinic schedule for the Family Practice doctors.

(2) Clinic and Walk-In Schedules. As with the on-call schedule, the clinic schedule is created by the ADC after considering all of the information relating to doctor availability. Staff doctors have a permanent clinic schedule for each month. This is affected only by leave requests and TDY orders from the doctors themselves. The ADC must also schedule residents-in-training for clinic duty. Each resident is assigned a primary location for each month by the Resident Director. The ADC keeps this information in his scheduling folder along with special instructions for each resident from his assigned clinic. These instructions, on 3" x 5" cards, contain information on the daily availability of the resident for duty in the Family Practice clinic. Also affecting the clinic schedule is the previous day's on-call schedule: the

doctor who was on call the previous day will not be available for work in the clinic on the day in question. The ADC creates the clinic schedule based on the number of doctors available for each day of the month. The final clinic schedule is submitted to the COSTARS data entry clerk so the appointment system can be updated to show which doctors will be available to see patients in the scheduled month. Also, for each day on the clinic schedule, the ADC schedules one doctor to see walk-in patients. This doctor is then responsible, on the day assigned, to see all family practice patients who could not get an appointment but required immediate care. The walk-in schedule is attached to the final clinic schedule and distributed to each doctor.

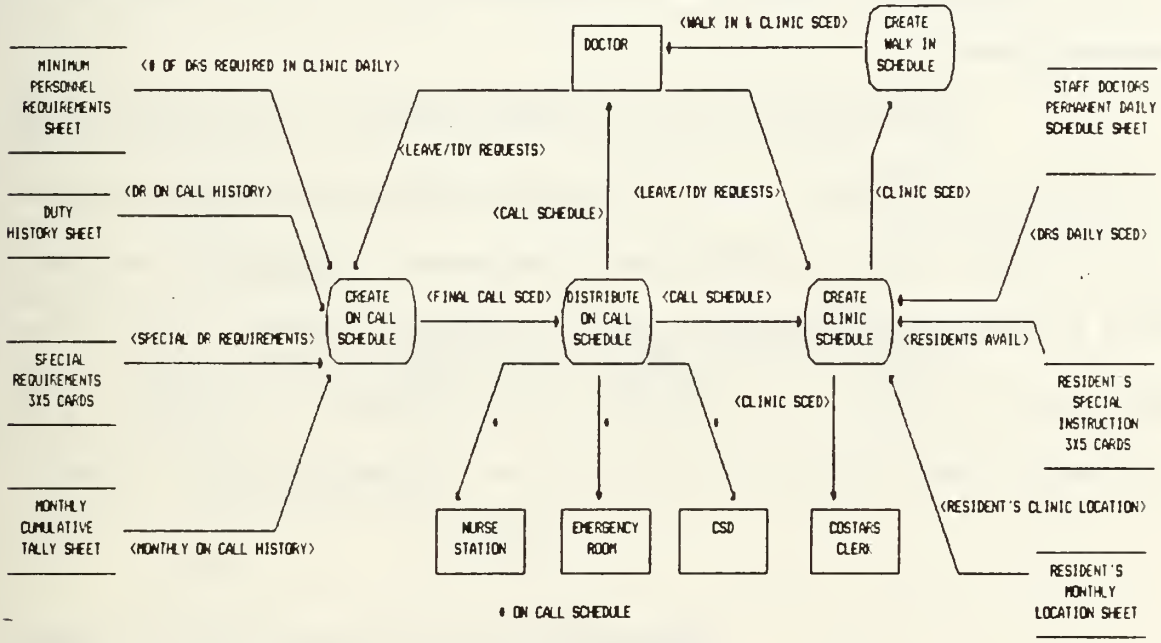


Figure 15. Family Practice Scheduling Data Flow Diagram

b. CTMC/FP Clinic Schedule

The Chief of the CTMC/FP clinic completes his clinic schedule in much the same manner as described for the family practice clinic. The on-call

schedule created by the ADC includes CTMC/FP doctors and therefore impacts the CTMC/FP daily clinic schedule. The Chief of CTMC/FP uses the previous day's on-call schedule to determine which doctor will not be available for duty on the current day. Additionally, he receives each of the CTMC/FP doctors leave and TDY requests and special availability requirements which he maintains in one log book. He consults this log book and the on-call schedule for the upcoming month to create the CTMC/FP schedule for that month. He distributes this schedule to each doctor and one copy is sent to the AQCESS data entry clerk who updates the appointment scheduling database to reflect the doctors available for appointments in the CTMC/FP clinic for the upcoming month.

As can be seen from the previous discussion, the scheduling process is subjective and dependent on the historical files and log books maintained by the clinic schedulers. The most difficult part of this process is obtaining and coordinating all of the information sources which affects the doctors' availability for duty on any given day of the month. The ADC estimated that it required 3 to 4 hours to create the monthly schedules because of the many factors influencing the entire process.

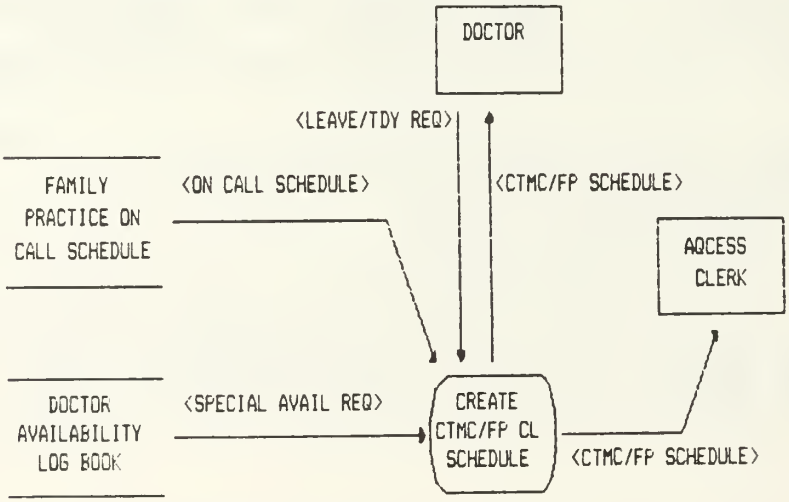


Figure 16. CTMC/FP Scheduling Data Flow Diagram

5. Patient Satisfaction (see DFD, Figure 17)

Determining patient satisfaction is a subjective process and is currently performed by the department's quality assurance representative. The QA representative created a questionnaire to obtain subjective responses from patients on various topics. The patients are asked to respond "Yes", "No", or "Not Applicable" to eleven questions concerning the care they received in the Family Practice clinic. This is the only clinic currently using the patient satisfaction survey.

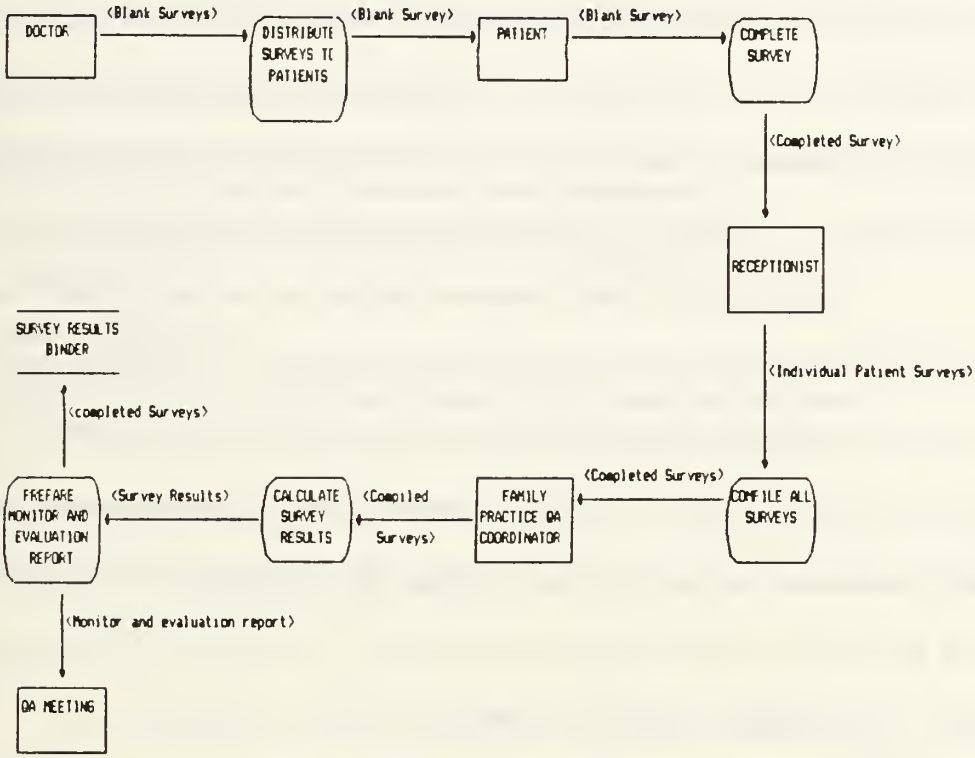


Figure 17. Patient Satisfaction Data Flow Diagram

On one day of each month, the doctors in the FP clinic are asked to distribute the questionnaires to the patients they see, with instructions that the patient return the surveys to the receptionist at the nurses station. The receptionist gives all

of the collected surveys to the QA representative who then calculates the percentage responses for each of the questions and produces Monitor and Evaluation Reports.

Each Monitor and Evaluation (M&E) report prepared by the department QA representative represents an important aspect of care recognized by the hospital QA Division (see example, Figure 18). Each question in the survey is an indicator of one of these important aspects of care. Each question (indicator) has an assigned threshold (listed on the M&E report) which the clinic desires to remain above. When the results of the survey are tallied, the QA representative pencils in the patient response rate for each question next to the corresponding threshold on the M&E report. The completed Monitor and Evaluation report's are used as an indicator of how successful the department was in reaching the thresholds for each of the important aspects of care.

These Monitor and Evaluation reports are maintained in a binder kept by the QA representative and are used at the monthly QA meetings to report on the general level of patient satisfaction for each of the important aspects of care. No other reports are created using the information obtained from the questionnaires and trends in patient responses are not maintained. The Department Chief does not receive a copy of the Monitor and Evaluation reports unless he requests them.

6. Productivity (see DFD, Figure 19)

The DFD in Figure 19 depicts the current information processes involved in reporting productivity for the DFPCM. The CTMC/FP section is the only section reporting productivity to the Department Chief. The primary reason for this is the fact that the CTMC is an ancillary service specially monitored by the Clinical

MONITOR & EVALUATION

SCOPE: Patient satisfaction

IMPORTANT ASPECT OF CARE: patients will be treated courteously and professionally by the staff.

INDICATORS:		THRESHOLD
1) Survey indicates records ready at the front desk	19/20	90%
2) Survey indicates screening prompt and private	70%	90%
3) Survey indicates waiting time will be 30 min or less		90%

actual result

SOURCE OF DATA: patients' survey

METHOD OF COLLECTION: Family practice receptions clerk provides patients with survey to be completed after appoinment.

WHO TO COLLECT DATA: Receptions clerk to forward to nurse or QA co-ordinator

SAMPLE SIZE: 30

TIME FRAME: One day per month, every other month starting with August88

Figure 18. Monitor and Evaluation Report

Support Division. The CTMC/FP appointments and patient visits are tracked by the AQCESS system.

The AQCESS system produces a report called the Validated Appointment Roster which shows the actual patients seen the previous day. This report is sent to the Clinical Support Division which counts the number of patients actually seen by the CTMC, per provider. A cumulative total is kept for the entire month. At the end of the month, the Clinical Support Division enters this information into a LOTUS 1-2-3 spreadsheet. The resulting productivity reports are sent to the Chief,

DFPCM. These reports provide information on daily, weekly, monthly, quarterly, and yearly workload in tabular and graphical formats. Provider productivity is also reported in a tabular report showing the number of patients seen each day, by provider, for the reported month.

Although the productivity of all of the sections is not directly reported to the Chief, the data necessary for producing clinical productivity information is gathered by each section. The remaining sections use either AQCESS, COSTARS or manual logs for gathering workload data. Patient visit information is then reported to the Patient Administration Division (PAD). PAD collects and forwards all hospital workload information to the Health Services Command on the MED 302 report both electronically and in paper format. This report is used in the formulation of future budgetary allocations to the hospital. Figure 20 illustrates how the various department clinics currently input their workload information to PAD. All of the workload data collected by the department's various sections is also stratified according to patient demographics, e.g., active duty, dependents, retired, service, etc.

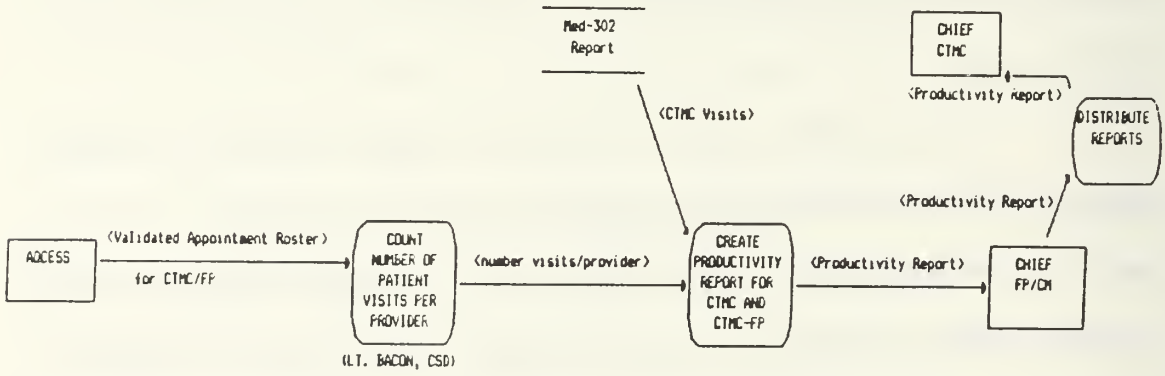


Figure 19. Productivity System Data Flow Diagram

The Department Chief wants productivity information for all of his clinics, similar to that provided to him by the Clinical Support Division for the CTMC/FP clinic. The raw data for creating most of this information exists in the current systems but is not being used because of time and personnel constraints, and other factors which were not readily identifiable.

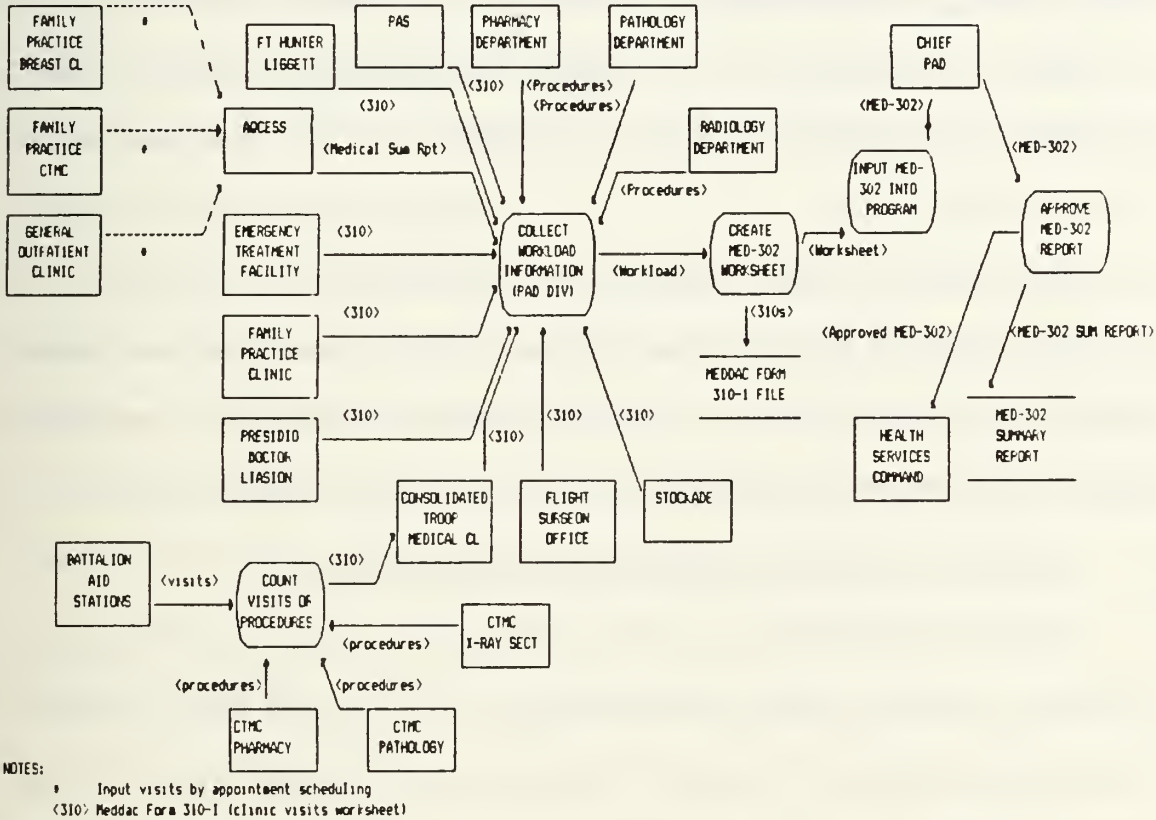


Figure 20. Clinic Workload Data Flow Diagram

IV. FUNCTIONAL SPECIFICATIONS

A. INTRODUCTION

Chapter III presented the DFPCM's current information systems relating to six specific areas: budget, equipment procurement, personnel, scheduling, patient satisfaction, and productivity. This chapter summarizes the current system's deficiencies and examines the failure of automation to meet the department's information requirements.

Additionally, this chapter proposes general improvements for each of the six areas and discusses the impact of these solutions, and the impact of automation on the department's information systems. The detailed system improvements for each of the information systems are presented fully in Chapter V, Requirements Analysis.

B. CURRENT INFORMATION SYSTEM DEFICIENCIES

The Chief of the DFPCM makes many decisions which affect both his personnel and resources, and greatly impacts the entire hospital. The nature of his responsibilities and the span of control he is required to exercise place additional emphasis on the significance of these decisions. Facing both time constraints and limited resources, he needs the right information, at the right time, and in the best format to accomplish his objectives and meet the needs of the department and the hospital. In analyzing the existing department information system, we discovered many deficiencies which hinder the Department Chief's ability to make informed decisions.

In general, the reports and other information the Department Chief receives are complex and difficult to quickly comprehend because they are not summary in nature. In interviews with the Department Chief, he expressed a desire for information which would depict long term trends and show department performance over a predetermined period of time. Much of the information he gets now is a "snap-shot" in time which does not allow him to see the "bigger picture" without pouring through many similar reports. In a few cases, the data is simply too time consuming to analyze (e.g., budget, equipment and personnel information) and, therefore, never becomes meaningful information for the Department Chief.

In addition to poor information, the Department Chief occasionally has difficulty getting enough information. One of the Department Chief's concerns is having sound information to help justify his decisions to higher authorities and support his actions in managing resources and personnel. Missing information due to informal reporting standards or poor data collection impedes his decision abilities in these areas.

Another concern of the Department Chief is the importance of feedback. The Department Chief feels it is critical for each section to receive sufficient, and timely, feedback on their performance to allow them to become more effective and efficient on there own initiative. The sections currently receive very little in the way of constructive feedback and the information they do get is prone to the same problems discussed above.

Unfortunately, inconsistent reporting requirements and system capabilities exist throughout the department so that each section is substantially different from the others in the information it is able to report. This contributes to many of the problems

described in the preceding paragraphs. Succinctly, the current information system is not meeting the requirements of the Department Chief. We feel the majority of these obstacles can be attributed to limited personnel resources, time constraints, and ultimately, the incompatibility of the hospital's automated information systems.

C. THE FAILURE OF AUTOMATION TO MEET INFORMATION REQUIREMENTS

Chapter II introduced the three major automated information systems in place in the hospital: MEPRS, AQCESS, and COSTARS. These systems hold huge stores of data which can potentially produce meaningful information. In addition to these medical information systems, the hospital uses other Army-wide systems for accounting and logistical data. Microcomputers are scattered throughout the hospital providing individual computing capabilities in some functional areas. With all of these resources at hand and with the rapid advance in information systems technology, the question arises, "Why hasn't automation solved the information problems within the DFPCM?"

There are many reasons why the automated systems at Silas B. Hays have failed to meet the information needs of it's key decision makers. The primary factors which have contributed to this failure are listed below:

- The AQCESS, MEPRS, and COSTARS systems are independent and incompatible with each other. Data sharing is impractical and duplication of data collection and data reporting are wasteful of time and resources.

- All of the sections within the department do not use the same system. For instance, the Family Practice Clinic uses COSTARS for appointments and patient records while the Consolidated Troop Medical Clinic, the Family Practice Clinic at the Consolidated Troop Medical Center, and the General Outpatient Clinic use AQCESS for appointments and patient information. The Fort Hunter Liggett and Presidio of Monterey Clinics, the Emergency Medical Services, and the Flight Surgeon's Office are completely manual.

- Much of the data kept by the accounting and logistical information systems is not divided by departments or sections, making information extraction difficult and time consuming.

- The method of inputs to the various systems are different, making it impossible to create standards for data collection and reporting.

- Hospital personnel are not adequately educated on the capabilities of the current information systems. In discussions with various department and hospital personnel, it was apparent they were unaware of the information available to them or of the procedures required to obtain the information.

- The reports produced by these systems are in tabular format and reflect the data for one period of time. Trend analysis over time is impossible without further manual manipulation of the data. Summary information is also difficult to obtain.

Although most of these problems are unsolvable within the scope of this thesis, evaluating the difficulties they create within the department's information system will assist us in identifying specific requirements for an improved information system.

D. PROPOSED INFORMATION SYSTEMS

The first two sections of this chapter addressed the overall problems which exist in the current information system. In identifying what the system lacks, we have thus helped identify what an improved system will require:

- Consistent data collection methods.

- Consolidated information.

- Concise, summary reports which are easy to read.

- Analysis of department and section performance trends over time.

- Easy data input methods.

- Feedback for department and section leaders.

- Standard reports.
- Complete and up to date information.

The remainder of this chapter is an analysis of the requirements for each of the specific areas described in Chapter III. Each section below summarizes the solutions we propose, supported by the Department Chief's requests, for the six major areas under consideration.

1. Budget Information System

a. System Deficiencies

The Department Chief has a budgetary system that meets only his minimal needs. The information listed below is provided to the Department Chief in tabular format by the microcomputer based spreadsheet program.

- Account Processing Code (APC). This code is generated by the Resource Management Division to identify separate identified fund accounts. A single section can have several fund accounts.
- Section name. The name the department assigns to each APC listed above.
- Allocated funds for the Quarter. The funds allocated for each APC for the quarter.
- Supply Expenditures for the Month.
- Total Department Expenditures for the Month.
- Total Spent this Quarter (cumulative)
- Uncommitted Funds this Quarter.
- Funds per Month (target expenditure for the section).
- Percent Spent for Month.
- Percent Saved for Month. This percentage is calculated by subtracting the percent spent for the month from 100 percent.

- Percent Spent for Quarter.
- Percent Saved for Quarter. This percentage is calculated by subtracting the percent spent for the quarter from 100 percent.

This information, though adequate, does not provide him with an easily decipherable format nor the capability to track spending habits for more than one month. The data used to generate the report, the Month End Report, is accurate but does not necessarily reflect any recent section expenditures. In spite of this problem, the information from the Month End Report is still considered accurate enough to be a good indicator of expenditures for the Department Chief.

The Department Chief also receives budget information from the two intradepartmental reports, the Resource Information Report (RIR) and the Budget and Equipment Analysis Report (BEAR). The budget sections of these reports are meant to provide the Department Chief with up to date budget information that is not currently reflected on the monthly budget worksheet. Though these reports were designed to report more current budget information, the information actually reported on the RIR and BEAR reports is a duplicate of the budget information already provided on the budget worksheet. In fact, the Department NCOIC stated that he often recopies the budget data onto the reports from the Month End Report.

The Department NCOIC currently maintains old copies of each budget report on computer disks. As each new report is needed, the Department NCOIC gathers the current information necessary to complete the spreadsheet. He gathers this data from either the current Month End Report or in the case of a quarterly or yearly recap report, from previous monthly reports. Once this new spreadsheet is created for

the report, he enters the sections' expenditures for the period into the spreadsheet. The input of each section's expenditure requires the Department NCOIC to search through the spreadsheet and find the location where the information must be entered. Although this process is not necessarily difficult, it is cumbersome and requires the Department NCOIC to have a working knowledge of both the spreadsheet's format and the application program. This system can be handled by a highly computer literate individual like the current Department NCOIC, but could easily become unworkable under a different NCOIC.

Data analysis requiring more than one month's data would involve the combination of several separately maintained spreadsheets. The old data is replaced each time a new report is created. The elimination of historical data makes long term trend analysis extremely difficult and cumbersome.

b. Proposed System Improvements

Data entry can be made simpler by standardizing the screen displays and inputs and by making the program environment transparent to the user. This data can also be maintained in a more accessible format, such as a database, for ad hoc inquiries. Maintaining the data within one consolidated database will also provide the capability to do long term analysis of expenditures. This ability to access the data allows the sections to retrieve information on their performance in the same format as seen by the Department Chief.

The data output can be improved through the use of graphs. The graphs will be used to display budgetary trends on a yearly basis which provides the Department Chief with a clearer picture of the budget fluctuations and trends over

time. These graphical printouts allow better analysis of the budget information with a lot less mental manipulation of the data. Printed tabular reports can be improved by reorganizing the presentation of the information.

c. *Impact of Automation*

Dr. Ertel best characterized the role of the microcomputer in automation by his statement:

> The proper role for the computer is to do what it does best: scan large numbers of records...rapidly, apply its infallible memory for detail, and serve as a communications link. (Ertel, 1984, p. 485)

The primary goal in our requirements specification is to avoid the creation of any additional and senseless work. This means avoiding the automation of something that does not need automating while automating those things that best fit the advantages of the microcomputer.

The budget system is already automated, though only in a limited sense. The improvements described in the previous section will have the following impact on the current information system:

- Simplification of the input process.
- The capability to maintain a larger database to facilitate trend analysis and graphing.
- Enhance the information's worth to the decision maker.
- The capability to graph the data versus displaying it in its current tabular format.
- Reduce the amount of time the person who receives the information must spend in deciphering the data to turn it into useful information.
- Provide for a user friendly system that will not require the user to master a computer or to learn a particular applications program.

- Providing the user with a menu driven work environment should make the transition between users less complicated.
- Enhance the choice of outputs (the ways the data can be viewed) for the Department Chief and his sections.

d. Impact of Proposed System

The information provided by the new budget information system will provide the decision maker with a more succinct view of the budget information than he currently receives. As discussed in the introductory sections, the Department Chief's time is limited and the ability to see the impact of information quickly without any major data manipulations is critical. The addition of a trend analysis capability will provide the Department Chief with the ability to forecast and manage his future budget requirements. By being able to pictorially depict his budget trends and status, the Chief can keep himself, his subordinates, and his superiors better informed.

2. Equipment Procurement System

a. System Deficiencies

The current equipment needs are identified through three sources: the Resource Information Report (RIR), the Budget and Equipment Analysis Report (BEAR), and the Information Capability Request (CAPR). The equipment needs identified by each of the department's sections are provided by the equipment sections of the RIR and BEAR reports. The Department Chief identifies new automated equipment requirements through the Information Capability Requests (CAPR).

The RIR contains the following equipment information:

- Old Equipment Status.
- New Equipment Status.

- Medical Care Support Equipment (MEDCASE) items (equipment needed).
- Capital Expense Equipment Program (CEEP) items (equipment needed).

The BEAR contains the following equipment information:

- Equipment to be replaced (immediately, within one year, within two years, and within three years).
- Money needed for equipment replacement (immediately, within one year, within two years, and within three years).
- Actual approved items now on the CEEP and MEDCASE program with the date item ordered and its projected arrival date.
- Paper work in progress for placing equipment either on the CEEP or MEDCASE programs and its paperwork status.

The problem with the information provided in the RIR and BEAR reports is redundancy. Each report seeks to collect information on only the high priority MEDCASE and CEEP requirements but within two different timeframes, quarterly for the BEAR and monthly for the RIR. These reports provide the Department Chief with only a limited look at his equipment needs and tend to track only those needs that are the most urgent (usually only MEDCASE and CEEP items). The reports do not give the Department Chief a consolidated look at all of his department's requirements. This fragmented approach to capturing the data makes it an intricate process for the Department Chief to estimate his future equipment needs. Since funds are limited, the Department Chief stated that he needs a consolidated listing of all his requirements to set replacement priorities throughout the department. The consolidation of this information would also be beneficial when bargaining with the hospital's equipment acquisition board (Programmed Budget Advisory Committee).

The CAPR requests provide the Department Chief with the following information:

- Functional area supported. i.e., automation, communications, records management, printing/publishing, and visual information.
- Justification for the equipment.
- A description of the changes and the reasons for the change to the existing service (if applicable).
- Source of funding for the equipment.

These requests are only tracked as they are generated.

The process of consolidating the equipment requirements identified in the BEAR, RIR, and CAPR requests is tedious and requires the Department Chief to manually consolidate all the section's separate reports. The current system also does not allow him to track the long term equipment requirements needed to determine if there are department-wide problems in the acquisition of equipment.

Other equipment needs that may not be as critical are not tracked or monitored. In addition, the Department Chief cannot track the section's past reported requirements which are either inadvertently or deliberately not listed on the current report. This requires him to either remember all of the past requests or manually search through the old RIR and BEAR reports to obtain this information.

The status of high priority equipment requests are reported on the BEAR and RIR reports. The only way to see the status for this equipment is to review each section's RIR and BEAR reports for this information. The Department Chief simply does not have the time to do this.

b. Proposed System Improvements

Any solution proposed for the equipment information system will undoubtably create some additional work for the department. Therefore, the primary consideration for the new equipment information system will be ease of data entry and familiarity with the entry format. The greatest improvement to the current system can be accomplished by the creation of a consolidated database where all equipment requests can be recorded and easily tracked. To identify equipment requirements, the Department NCOIC suggested the following types of information be used in the database:

- Item description.
- National Stock Number.
- Section requesting the equipment.
- Date requested.
- Type of request (MEDCASE, CEEP, CAPR, Other).
- Priority of equipment within a category.
- Urgency of need (immediate, one year, etc.).
- Quantity desired.
- Unit price and associated extended price.
- Status of request (requisition number).
- Cumulative recap of required expenditures.

Once an item is deleted from the active database due to the delivery of the equipment, its data should be relegated to a historical database for the analysis of long term equipment trends.

The design of the user interface is critical. Once again, data entry should be simple and straightforward. The outputs can reflect either a recap by equipment category or a consolidated listing of all equipment requirements. The current reports should be consolidated into a single report and standardized and simplified to match the inputs required by the user data entry interface. The system should be built to facilitate ad hoc inquiries on the database and to do limited mathematical calculations to subtotal categories and run cumulative totals within categories.

c. *Impact of Automation*

The equipment procurement information system is not currently automated. The most far reaching impact of automating this system will be the work required to enter data from the consolidated Resource Information Report into the new equipment database. On the other hand, the Department Chief considers the availability of this information important for resource management. As stated earlier, a well designed user interface should limit data entry to the format recognized in the RIR. Specifically, automation will:

- Provide the department with a consolidated listing of all equipment requirements and the capability to report separate categories without leaving the database.
- Provide the Department Chief with the ability to request the information in the format he needs for a particular situation.
- Provide a historical database of equipment requirements that can be analyzed to determine equipment procurement trends over the long term.

The Department Chief currently feels that the benefits associated with automation in this area will far exceed the costs, provided the user interface is kept simple.

d. Impact of Proposed System

The proposed system will provide the Department Chief with a consolidated listing of all his sections' equipment requirements. This information will provide him with a capability to sort equipment needs by cost, category, or priority within the separate equipment categories, e.g., CEEP, MEDCASE, etc. In this information lies the ability to bargain with the hospital resourcing committees by having the information readily at hand and in a format which will facilitate this "give and take" environment. By knowing all of his requirements, the Chief can better manage his resources to meet those equipment needs that are the most critical to his department's success. With his limited time, the consolidated format allows him to digest the information quickly. Through the listings of future needs, he can better plan the budgets to meet those needs. This new system will serve to facilitate unique information needs quickly and with less inconvenience in obtaining that data.

3. Personnel System

a. System Deficiencies

As discussed in the previous chapter, the Department Chief has two areas of concern with the personnel information system: tracking and reporting manpower levels and funding for the Continuing Medical Education (CME) program.

The Department Chief currently tracks personnel manning levels by maintaining this information within a word processing shell. This format is not easy to update. It limits the types of reports you can generate and the type of analysis that can be done on the data. Without an ad hoc capability, the Department Chief must visualize position vacancies by scanning the complete listing. This format also restricts

the types of additional data that can be maintained with the personnel listing, i.e., doctor patient panels, productivity information, or leave and absence requests. This also precludes any data interfaces with other information systems, such as scheduling. The update process is complicated in that it involves printing the entire form and then cutting the report into individual sections. Likewise a section which requests a listing must be satisfied with a department-wide listing.

The CME listing is currently maintained on a spreadsheet. This type of format, though adequate, hampers the ability of anyone to do ad hoc analysis. Any trend analysis beyond the current year is limited. A person unfamiliar with the application program may have difficulty updating the CME spreadsheet.

b. Proposed System Improvements

The current personnel listing can be integrated into a database to provide the Department Chief with the capability to keep critical personnel information. The database should contain the following database files:

- Position Information (TDA position, authorization, etc.).
- Personnel Information (Name, SSN, and Known Loss Date).
- Personal Information (Protected, including address, spouses name, children, birthday, telephone number, etc.).
- Leave/Absence Log (Interfaces with CME listing and scheduling system, but would also include other types of absences, i.e., leaves, emergency leaves, other TDY, or unusual planned absences).
- CME listing. (Interface with the Doctor listing and the Absence Log but also includes critical CME information, i.e., estimated costs, actual costs, qualification, etc.).

The various relationships between the database files can be kept transparent to the user. All requested reports can be created by linking the needed database files. The Department Chief will have access to a list of planned absences, anticipated losses, and vacancies that he did not have previously. The consolidation of the CME listing with the personnel listing will consolidate the data entry requirements under one person, therefore freeing critical personnel to do their primary jobs. This type of data format facilitates any type of report the sections or the Department Chief could request. In addition, the scheduler can receive a list of the planned absences and not have to rely on verbal notifications from the doctors (see Section D.4., Scheduling).

Once again, by building a user interface that is independent of the program used, the requirement for any application programming familiarity is no longer necessary.

The current system requires two separate routes for leave requests, depending on the person requesting leave. The flow of information can be improved by centralizing all the data entry and flows for leaves into one location. By centralizing this data flow, the leave requests, as well as personnel updates, can be combined to avoid the redundancy of the data maintained.

c. *Impact of Automation*

Automation will improve the system in the following areas:

- Improved user interface. The system can be independent of the knowledge of the user.
- The choice and diversity of reporting capabilities will be enhanced.
- The leave log is currently maintained manually. By automating this log, the data can be linked to the other systems, particularly the scheduling system.

- The data will be made easier to maintain and to update.
- The Department Chief will be able to maintain a protected personal database on his personnel.
- The need to consolidate all data flows through one central location will involve changing some internal procedures within the department. These changes must be validated to meet regulations and will cause some personnel changes.
- The initial setup will be costly in terms of the database. The maintenance of this large database will require the use of a data entry clerk, but the work can be minimized by a well designed user interface.

d. Impact of Proposed System

With an enhanced database, the Department Chief can maintain the type of data he needs to track his personnel. Through a vacancy listing and the anticipated loss listing, the Department Chief can always know, with one simple listing, the vacancies or projected losses that exist in his department. This information can then be used at critical hospital meetings to quickly identify his needs in a straightforward format. At the same time, the addition of personal information, readily accessible to him, makes his job as senior counselor easier. The absence listing gives him a monthly listing of the personnel that will not be available during a specified time period. This information is critical for monitoring the workload throughout the department and greatly enhances the Department Chief's ability to predict periods of high stress due to personnel shortages. The management of CME funds will always remain critical. Doctors need the necessary education to keep them up to date in their medical practice but in periods of increasing resource constraints, the ability to predict and justify these requirements is critical.

4. Scheduling System

a. System Deficiencies

Scheduling is a complex, subjective process requiring a great deal of independent information. In the existing scheduling system, this information is collected in many different ways, at different times, and in different formats. This information is subjectively interpreted and evaluated to produce the three required Family Practice schedules and the CTMC/FP schedules. Specific problem areas within the current scheduling process (as shown in Chapter III, Figures 15 and 16) are listed below:

- Doctor's leave and TDY requests are verbal. The scheduler depends on the individual doctor to inform him of upcoming absences. There is no standard form or time requirements for providing this information.

- The independent sources of information are maintained informally, i.e., some are recorded on yellow legal paper, other information is kept on 3" x 5" cards, and still others are typed on regular white paper.

- There is no formal instruction for the collection or maintenance of the information necessary for scheduling. The Assistant Department Chief (ADC) currently keeps all the scheduling paperwork in a manila folder and the CTMC/FP chief has a green log book in which he records doctor availability information.

b. Proposed System Improvements

The subjective nature of the scheduling process and the diverse sources of the necessary information place restrictions on the improvements which can be made and the resulting benefits of these improvements. We feel attempting to automate the process, in this case, is infeasible. Automated scheduling applications requires integer programming and optimization techniques far beyond the scope of this thesis. Additionally, complex scheduling algorithms often require the computing power of a

mainframe computer for the rapid calculations and reiterations of scheduling models. (Lyons, 1983, p. 438) Therefore, instead of concentrating on the process of actually creating the schedule, we propose improved methods of collecting, maintaining, and assimilating the necessary information. Developing a scheduling optimization model could be the subject of future research.

As described in the previous section on the Personnel System, an automated leave/TDY log could be used to record all requests for leave as soon as they are approved by the Department Chief. A simple report listing each doctor's requested leave dates could be produced for the ADC just prior to the creation of the following month's schedule. This would ensure the ADC had all doctor's leave and TDY dates, without having to rely on verbal information or "Post-it-Notes" stuck on his office door.

In evaluating the other methods for collecting and maintaining doctor information, we found that automation would again be infeasible. In this case, the department schedulers do not have ready access to microcomputers and will probably not have access in the near future. Additionally, automating manual records can sometimes cause more work than it saves. For instance, in keeping the monthly cumulative tally sheet described in Chapter III, the ADC simply puts tick marks beside doctors names to show how many times they were on call for the month. If this tally sheet were automated, what now takes the ADC 2 or 3 minutes to perform might take 10 or 15 minutes by the time he turns the computer on, loads the application program, and selects and updates the doctor's information.

Improvements can be made, however, if the forms for recording and reporting information are standardized and a more formal method of coordinating the information is developed. Using the monthly cumulative tally sheet to illustrate, preprinted forms with the months of the year listed across the top and the doctors names on the left could be used instead of the handwritten yellow legal paper. Other forms depicted in Chapter III, Figures 15 and 16 could be standardized and preprinted. This would make formalizing instructions easier and would positively influence the scheduler's assimilation of data when producing the schedules.

Keeping these standardized forms in a folder or binder is sufficient, as long as there are some basic instructions on where to get the printed forms (e.g., the department secretary's office) and the doctor's leave report so that a newcomer to the job will not revert to an unorganized system.

c. Impact of Automation

As presented in the last two sections, automating the scheduling process for the DFPCM would be infeasible within the scope of this thesis. Where automation would benefit the scheduling process is in providing consolidated information concerning doctor's leave and TDY requests. This is discussed more fully in the section on personnel. The preprinted forms for standardizing the information collection and maintenance functions could be created and kept on a floppy disk in the department's administrative office. They can then be printed as needed by the ADC.

d. Impact of Proposed System

The improvements suggested for the scheduling system deal mainly with organization and standardization of the information collection, maintenance, and

reporting functions. Although the process will remain virtually the same, the schedulers will find it much easier to gather and assimilate the data concerning the individual doctor's availability status. Designing a good manual user interface (forms, reports, instructions, etc.), like designing a computer user interface (menus, data entry forms, reports, screens) is important. "You will learn and use a system better if it has a consistent user interface." (Burnett, 1988, p. 29) Organizing and standardizing the various forms and reports will assist the scheduler in recording, finding, and understanding necessary information. It will also be much easier for him to explain the system when he turns the scheduling job over to another person, as often happens in the military. Clear instructions are vital for a good transition file.

The process of scheduling department doctors will, for the time being, remain a subjective decision making process. Formalized methods of collecting and reporting information, however, will ease the process by allowing the department schedulers to more rapidly assess the information presented to them.

5. Patient Satisfaction System

a. System Deficiencies

Patient satisfaction is difficult to define and measure. The concept of satisfaction is viewed differently by each patient and is influenced by different factors. One person may base satisfaction on the courtesy of the doctor, another on the amount of time he had to wait to see the doctor. Some people agree that hospital satisfaction is "the consumer's overall emotional feelings about a hospital following his or her visit" (Swan, and others, 1987). Because of the differences in opinions on this matter, it is important to identify some basic dimensions which might be indicators of

satisfaction. The evaluation of these dimensions can then be determined by using a questionnaire to measure patient opinion on the various dimensions. It is also important to realize that "many questionnaires are developed not with the intent of determining global patient satisfaction, but instead, to address only those dimensions of satisfaction with which an organization is willing or able to react". (Pelletier, 1985)

Applying these concepts to the DFPCM involved evaluating the effectiveness of the current patient satisfaction questionnaire and the value of the information it provides.

The basic content of the current questionnaire closely matches the Department Chief's desires. Table IV shows the dimensions of satisfaction perceived by the Department Chief as necessary for effective evaluation of patient satisfaction. The current questionnaire covers most of these dimensions except as noted in Table IV. The questionnaire lacks two important features: a brief explanation of the purpose of the questionnaire; and instructions for completing and submitting the questionnaire. The patient currently receives verbal instructions from the doctor distributing the questionnaire. These instructions will vary slightly from doctor to doctor.

The format for obtaining patient response is not as effective as it could be. Instead of "YES/NO" questions, the Department Chief would like the answers to be scaled, e.g., options from poor to excellent using a scale of one to five. "YES/NO" questions are considered too restrictive while a scale indicates a degree of intensity (Duffe, 1985). For our purposes, a scale would show the general <u>level</u> of patient satisfaction with respect to the given dimensions.

Table IV DIMENSIONS OF SATISFACTION

**	ACCESS TO CARE	How long it takes to get an appointment.
	WAITING TIME	How long it takes to see a doctor.
	COURTESY OF STAFF	Doctors, Nurses, Clerks.
	UNDERSTAND TREATMENT	Explanation of procedures.
**	CLINICAL ENVIRONMENT	Cleanliness of clinic.
	PHYSICIAN TIME ALLOCATION	Adequacy of time spent with doctor.
	GENERAL SATISFACTION	General opinion of the care received for a particular visit.

** Dimensions not included in current questionnaire

The primary problem with the existing system is in the output generated from the questionnaire results. Each question is treated as a discrete entity, one indicator of an important aspect of care. As such, only one-time, discrete response rates can be obtained for each question. Additionally, the questionnaire results are not being tracked or reported. As discussed throughout this thesis, the Department Chief wants summary information which depicts comparisons and trends. The Monitor and Evaluation reports do not provide this information.

b. Proposed System Improvements

There are two basic improvements which need to be made for the patient satisfaction system. First, the questionnaire must be redesigned to include all of the dimensions of satisfaction identified by the Department Chief, listed in Table IV. This redesign must also incorporate the desired scales for applicable questions. In addition, the questionnaire should include a statement of purpose and instructions to the patient on how to complete and submit the questionnaire. Although some literature

suggests that a cover letter be included (Landry, 1987, p. 16), we believe a simple one page questionnaire will be received better by the patients and will be easier to collect and review.

Secondly, the results of the questionnaire need to be reported in a more meaningful, effective method. The Department Chief should be able to view trend lines and other graphical information to determine the level of satisfaction with respect to various dimensions. Comparing the dimensions, when appropriate, should also be made easier. Providing this information using automation would require the questionnaire data to be entered into a computer program which would manipulate and compute the desired results and produce the desired output.

c. Impact of Automation

If the responses in the questionnaire are coded, the patient response can be easily entered into a computer. Once this is done, the application program would automatically compute the results and print or display the desired output in tabular or graphical form. Automation will allow rapid trend analysis and graph generation and provide a means for storing historical results for future analysis if desired. To perform these functions manually would require an inordinate amount of time and the resulting benefits would thus be outweighed by the costs. The Department Chief has clearly stated the shortage of personnel in his department precludes implementing any system which would require excessive input or evaluation time. The time the QA representative now spends hand calculating the results of the current questionnaire would be converted to time spent by a data entry clerk entering the raw data from the returned questionnaires.

d. Impact of Proposed System

The proposals outlined above will improve the patient satisfaction information system in several ways:

- A questionnaire which is easy to understand and complete is more likely to be submitted by the patients.
- Improved questions will meet the Department Chief's stated dimensions of satisfaction.
- Redesigned answer formats (scales) will provide more meaningful information to the Department Chief on the level of satisfaction of the patients.
- Automated applications will free the QA representative from the time consuming task of hand calculating the response rates for each question.
- Through automation, improvements in data analysis, storage, and reporting can be realized with minimal time requirements.
- Producing more meaningful reports will allow the Department Chief to spend less time analyzing the data and draw more accurate conclusions from the information presented. Trend analysis and historical comparisons will give indications of possible problems and potential improvements in the care provided by the department.

6. Productivity System

a. System Deficiencies

The main problem with the productivity information system is that only the CTMC and CTMC/FP clinics are being monitored for productivity. The Department Chief likes most of the tables and graphs produced by the Clinical Support Division for the CTMC clinics but would like to receive this information for each of his other sections. Unfortunately, all of the sections do not use the same system to record patient visits and doctor workload. CTMC uses AQCESS, Family Practice uses COSTARS, and other sections use a manual system. Thus, to provide the Chief with

the information he desires will require collecting and consolidating the clinic and doctor workload statistics from each separate clinic.

b. Proposed System Improvements

The Department Chief is interested in obtaining productivity information for two distinct purposes: monitoring each individual doctor's workload (based on the number of patients seen), and monitoring the overall workload of each clinic (based on the total number of visits).

Monitoring each doctor's productivity was determined to be beyond the scope of this thesis for the following reasons:

- Only clinics using automated appointment systems, i.e., AQCESS and COSTARS, maintain individual doctor workload data.
- Productivity information for each doctor would be impractical to obtain manually because of the high volume of patients treated by each clinic.
- The appointment systems use different measures of doctor availability and do not factor in doctor absences, e.g., leave and TDY, when computing doctor workload. These disparities result in inconsistencies between the resulting doctor productivity figures.

For these reasons, individual doctor productivity will not be discussed in the remainder of the thesis but could be the subject of future research.

Overall clinic workload data, in terms of the number of patient visits, is reported monthly by each section to the Patient Administration Division (PAD). This information is already mandatory and can be obtained from PAD either manually from the printed MED 302 report or automatically from the data in the PAD worksheet (see discussion in Chapter III). The use of an automated data capture routine will preclude

the sections from having to provide another copy of their workload reports to the department.

The improvements necessary to obtain the clinic productivity information involve collecting all of the section's visit data for entry into an overall department system. With a consolidated database of department visit information, productivity reports can be produced to show monthly clinic workload and yearly productivity trends. The productivity database can be combined with the budget database to produce information relating department and clinic monthly expenditures to monthly workload data.

c. Impact of Automation

Automating clinic workload reporting would result in the following benefits:

- The Chief can monitor the aggregate workload, by section, to determine trends in patient visits and the need to shift resources to meet needs.
- The department will be able to monitor its workload in relation to its budget.

d. Impact of Proposed System

The aggregate number of patient visits is important information. The number of patients seen by a section can be compared with the dollar amounts of supplies used to track and estimate budget requirements and justify spending patterns for the Department Chief. The trends and seasonal changes in patient visits can be analyzed over time to assist the Department Chief in planning for future requirements.

V. REQUIREMENTS ANALYSIS

A. INTRODUCTION

This chapter presents the requirements analysis for the DFPCM information system. These requirements were determined through prototyping as discussed in Chapter II. The requirements analysis is based on the functional specifications for each system described in Chapter IV and provides a more detailed look at the inputs, outputs, data structures and user interfaces required to meet the functional specifications. We used User Concept Diagrams (UCDs), described in the following section, to depict the requirements for the systems and aid in establishing the prototypes.

Having analyzed the current system (Chapter III) and proposed improvements (Chapter IV), the requirements analysis is the first step toward actually building an improved information system. This thesis takes the requirements analysis phase of the development life cycle through one iteration of the requirements prototype. The number of iterations which will ultimately be required for the prototype is unknown and will vary for different development projects. Once the prototypes are accepted by the users, the system development can continue with design and implementation. The remainder of the chapter presents the identified requirements for the DFPCM information system.

B. USER CONCEPT DIAGRAMS

Chapter III introduced data flow diagrams as a way to depict the current information system. Although DFD's are being used extensively by systems analysts, there are many other methods available for relating information system functions and data flows to the user. One of these methods is the User Concept Diagram (UCD) developed by Charles F. Martin in 1988.

Martin designed UCDs to supplant DFDs for representing the information system to the user. UCDs have several advantages over DFDs. These advantages result from the use of additional symbols to represent entities and interactions not present in DFDs. The major advantages are listed below:

- External entity symbols clearly indicate data flows into and out of the automated system.
- The use of multiple symbols for external entities more closely depicts the objects they are intended to represent.
- The intended user is identified with his type of interface so the interactions of the system can be designed for compatibility with intended users.
- Symbols can be easily drawn with standard flow chart templates or automated graphics packages.
- Different storage and output mediums can be easily portrayed. (Martin, 1988, pp. 65-84)

Figure 21 shows the basic UCD symbols (more can be created to meet a particular analyst's needs). Although UCDs use more symbols, the resulting diagrams are easier to explain to the users because they are "pictorially more suggestive of the objects they represent" (Martin, 1988, p. 65). We found this to be true in our

interactions with the DFPCM users. Thus, in the requirements analyses that follow, we use UCDs to depict the department's information system requirements.

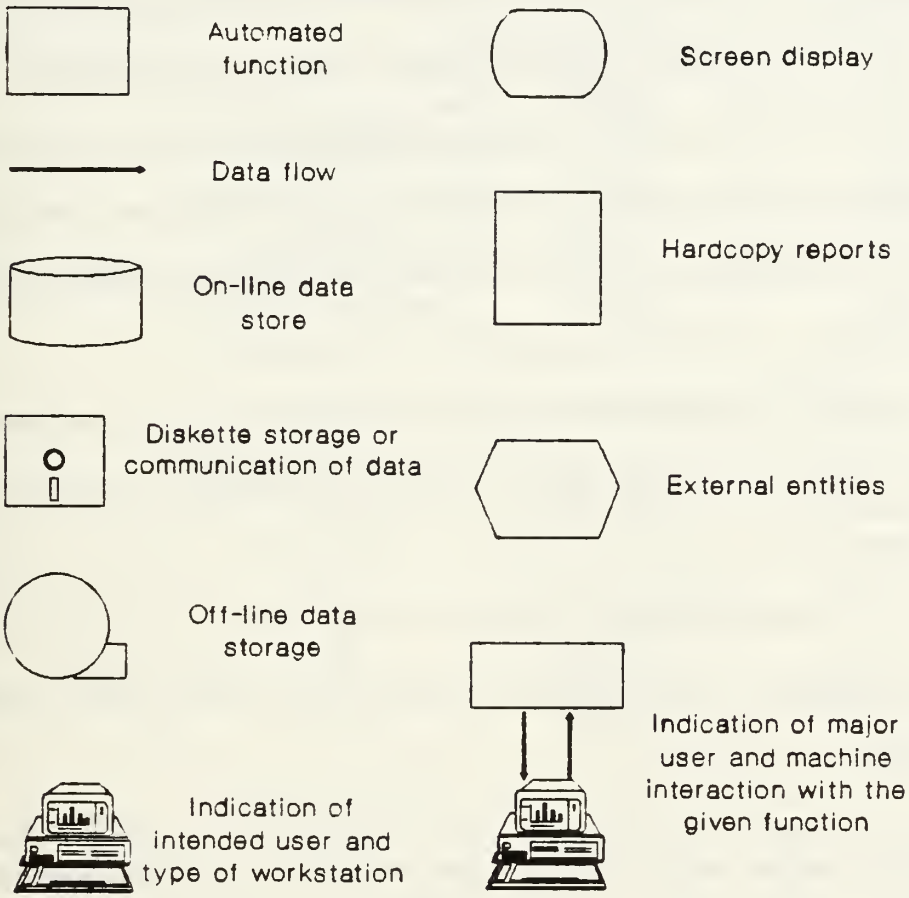


Figure 21. User Concept Diagrams

C. GENERAL REQUIREMENTS

1. User Interface Design

The design of the interface is perhaps one of the most critical aspects in the development of a prototype for the DFPCM. "Ease of use", "user friendly", and "ergonomic design" are all industry buzzwords that simply mean one thing: make the interface work for the user in the way they expect it to work in their environment.

Many factors determine who will be the users and when and how they will use the system. The environment at the hospital provides a challenging set of circumstances for the design of the interface. The target DFPCM information system user will most likely be a novice, untrained in both computers and applications programs. He or she will not have the time to learn complicated applications program because of many more urgent duties. The information system will not have dedicated data entry clerks and will, in all probability, rely on the availability of someone who has other pressing matters at hand.

Martin's Human Factors/Computer Knowledge Structure, as depicted in Table V, served as the basis for the interface designs in developing the initial prototype (Martin, 1987, p. 335).

To properly humanize software through the use of ergonomic design principles, Knittle and Gardner suggest the designer follow the principles listed below (Knittle, 1987, pp. 164-171):

- Minimize worker effort. The user should only perform essential, non-automatable tasks, avoiding repetition of work already accomplished (Knittle, 1987, p. 164). All inputs should be in the format that the user is already familiar with, i.e., a commonly used written form or report.
- Minimize worker memorization.
- Minimize worker frustration. Keep the user aware of delays in accomplishment and if necessary give them progress reports (Knittle, 1987, p. 166).
- Maximize use of habit patterns.
- Notify users of problems promptly.
- Maximize worker control of tasks.
- Maximize task support.

Table V HUMAN FACTORS/COMPUTER KNOWLEDGE STRUCTURE (Martin and Fuerst, 1987, p. 335)

Human factor	Human subfactor	User computer knowledge	
		Novice	Experienced
Nature of message	Tone	Explanatory and polite	Short and to the point
	Use of humor	Careful	None
	Bypasses	None	Allow
	Warnings	Many	Rarely
	Screen format	Menu	Inquiry
	Input verification	Always	Rarely
	High lighting	Some (judiciously)	Little
	Defaults	With explanation	Without explanation
	Screen discontinuation	Prompt and keyed response	Keyed response without prompt
Help function	Procedures	Full, unsolicited	Upon request
	Values	Full, unsolicited	Upon request
Response time	Mean	Minimize within variance	Minimize
	Variance	Minimize	Minimize within mean
Path process	Menu structure	Depth	Breadth
	Overall screen density	Minimize	Maximize

Screen design is another aspect of humanizing software. Stahl recommends the following guidelines in the design of screens which support user friendliness. (Stahl, 1986, p. 60).

- Do not crowd the screen. "Good screens look good."
- Use highlighting, blinking, and reverse video sparingly. Overuse will lead to operator fatigue.

- Use color sparingly. Color is an appealing and proven way to enhance computer input. The following foreground/background screen combinations are listed in order of legibility, from the most legible to the least legible (Ives, 1982, pp.15-47).

MOST LEGIBLE	Black on Yellow
	Green on White
	Blue on White
	White on Blue
	Yellow on Black
	White on Red
	White on Orange
	White on Black
	Red on Yellow
	Green on Red
	Red on Green
LEAST LEGIBLE	Blue on Red

- Limit the amount of information on each screen to what is necessary. Do not force the user to remember things from one screen to the next.

- Minimize key strokes.

- Minimize cursor movement.

- Show the maximum permissible length of an input field with underscores, highlighting, or brackets.

- Keep the screen consistent with paper input forms. Although all information from the paper form may not need to be entered on the screen, the screen should follow the general flow of information on the paper form. (Kendall and Kendall, 1988, p. 484).

Messages to the user, an essential element in user friendly screens, should be: (1) consistently positioned, (2) short, meaningful, common and fully spelled out, (3) affirmative, (4) in the active voice, and (5) in the temporal sequence of events. (Galitz, 1983, p. 9).

Another aspect of interface design is the design of menus. The user should be able to identify which transactions are available through a series of logically related

and relevant events common to a menu screen. The menu screens for the DFPCM information systems are depicted in the following sections by the use of Menu Hierarchy Charts.

2. Standard Interface Designs

Understanding the importance of a good user interface, we designed a set of standard interfaces for getting user input and for displaying output on the screen for each of the systems. The following sections describe the standard input and output designs which are applicable to all of the systems. Within the detailed requirements for each system, we present a specific description of the data required for the inputs and outputs related to that system. Appendix A, the Data Dictionary, contains detailed information about the data structure of the system's databases.

a. Input Screens

The majority of the input screens were generated with a commercially available database screen generator. The screen generator displays the available fields from the database in use and allows the analyst to load and position the desired fields onto the screen to create a functional input format. The program which generates this screen is saved and called into use whenever the user selects an input option from one of the menu systems. Appendix B is the program listing of all of the format screens for the DFPCM information system.

The screen generator allows the system designer to easily load and manipulate the necessary input fields to create good user interfaces. The screen formats are easy to change to suit the user's requirements, making the generator an invaluable tool when prototyping the requirements analysis. Examples of each of the

input screens designed are included with the detailed requirements analysis for each system, with a description of the necessary input fields.

Other standard input screens are those used to accept input from the user necessary for identifying further processing requirements, such as the year and month for a desired report or a person's identification number for updating his or her personal information. These screens are created with programming commands which identify where the prompts and input blocks appear and any other information needed on the screen. An example of these interactive screens is shown in Figure 22. Where possible, we have designed these screens to position prompts, input blocks, and instructions in the same locations and with similar terminology. Whenever the user is asked to input a coded response, e.g., the Section Code shown in the example, he or she should be allowed to view a help screen showing the valid codes for that particular item, e.g., FPC = Family Practice Clinic.

```
Enter the Year for report: 89
Enter the Month for report: 10
```

```
Enter the Clinic section code for report: FPC
```

Figure 22. Sample Interactive Input Screen

b. Review Screens

In many of the system menus, there is an option for reviewing database information on the screen. The review screens are easily created with commercially available database software (e.g., DBASE III+) by using a programming command and

specifying the fields desired for display. An example of a typical review screen used in the DFPCM information system is shown below.

APC	DESCRIPTION	SECT_CODE	POC	TELEPHONE
W357	FAM PRAC CLINIC	FPC	TURNER	8888888
W358	CTMC-FPC	CFP	SHAW	7777777
W360	EMERGENCY MED	EMS	BLAKE	6666666

The field names are printed across the top of the screen, in the order given in the program command. The specified fields for each applicable record are displayed beneath the corresponding field title. The analyst can program the review screen to allow the user to change certain data or prevent the user from making any changes while reviewing the database information. Review screens used throughout the system are similar in format. The specific fields required for display for each review are described within the detailed requirements for the applicable system. As with generated screen inputs, analysts can easily update review screens to meet user requirements during prototyping.

3. Requirement Analysis Constraints

The detailed analyses which follow describe the data structures, menus, inputs, outputs, and user interactions for each of the systems under consideration. Many of the tables and graphs produced by the systems require extensive data manipulations and in some cases, interaction with more than one software package. The design of the detailed programming for these data manipulations and extractions is beyond the scope of this thesis and is therefore not included in the detailed system requirements. The output examples were generated using sample data similar to that which would be extracted from the database. Where applicable, the program listings

for each system contain comment statements indicating where data manipulations and report generation would have to occur to produce the desired output. Within the system requirements is a detailed description of the data elements necessary to create the outputs. The actual method of output generation will depend on the software packages used. For example, if the database software has graphing capability, the graphs can be generated internally from the existing data. If not, the data will have to be moved to a separate graphics software package to produce the desired graphs. These software specific constraints are not included as part of the requirements analysis but would have to be considered further in the development life cycle, once the design and software selections have taken place.

D. DETAILED REQUIREMENTS

1. Budget Information System (see Program, Appendix C)

Figure 23, a user concept diagram, gives a picture of the components of the new budget information system. The user concept diagram, as discussed in the previous section, allowed us to give the Department Chief a general picture of the new requirements necessary for the budget information system.

a. Data Structures

To successfully meet the needs of the Department Chief, the data structure for the budget system was designed to provide maximum flexibility in data retrieval and analysis. Each database was designed to represent a portion of the budget process, e.g., the receipt of the quarter's budget allocations or the receipt of the section's expenditures as reported in the month end report. Figure 24 represents how each database relates with the other databases in the budget information system.

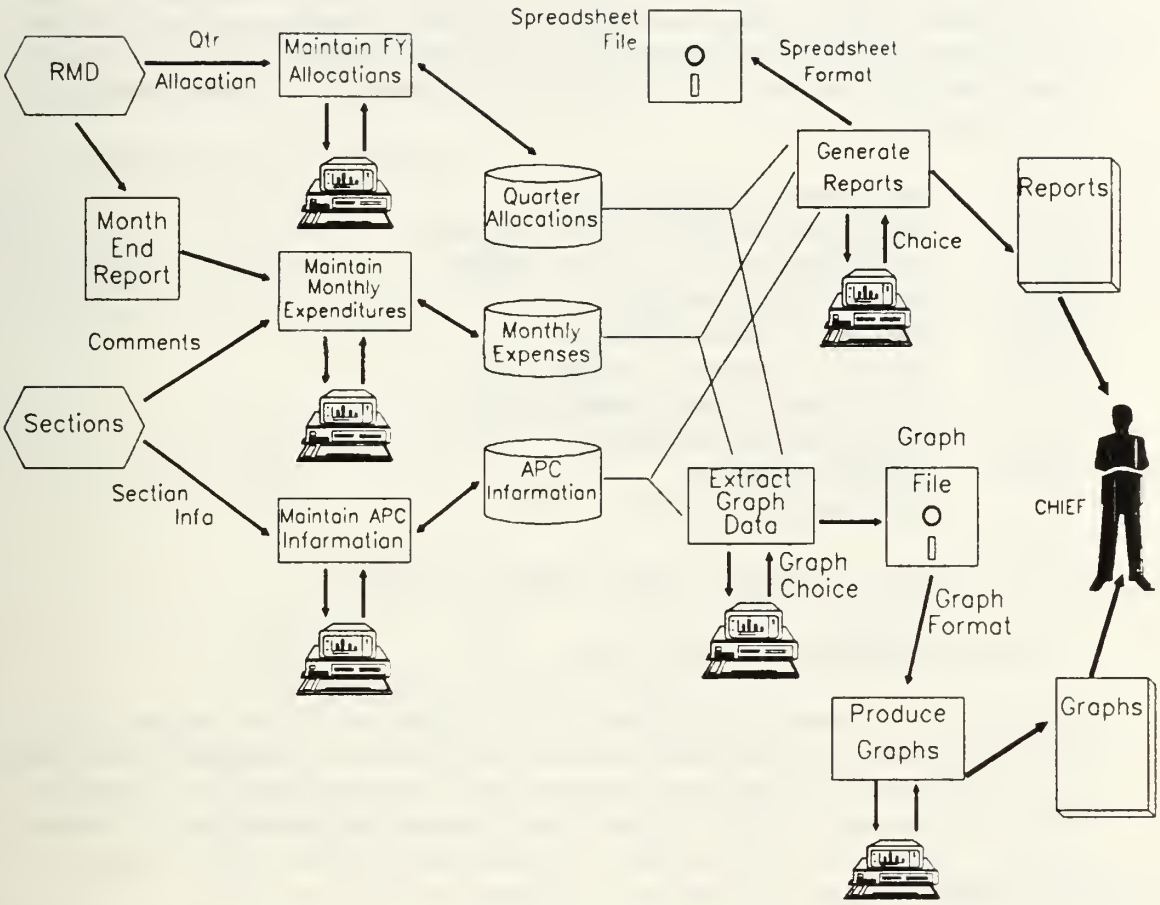


Figure 23. Budget Information System User Concept Diagram

The structure of the data fields facilitates the combination of databases through the use of relationships among the key fields between the databases. The key field identified throughout the budget databases is the Account Processing Code (APC) which is used within the hospital for financial accounting purposes.

The APC database contains the following data fields:

- Account Processing Code. Hospital-wide funding code.
- Section Description. This is the specific department name associated with a particular APC code.
- Section Code. This field was designed to represent the true organizational structure of the department. It allows the system to interrelate sections along

organizational lines versus the artificial budgetary lines necessitated by the APC funding codes. This convention allows other subsystems of the DFPCM information system to relate budgetary information along the same command lines, such as is necessary in the Productivity system. The codes used in this field include:

DEP	Department Headquarters
FPC	Family Practice Clinic, Main Hospital
CFP	Family Practice Clinic, Troop Clinic
GOC	General Outpatient Clinic
EMS	Emergency Medical Services
POM	Presidio of Monterey Health Clinic
CTM	Consolidated Troop Medical Clinic
FHL	Fort Hunter Liggett Clinic
AMB	Ambulance Section
FSO	Flight Surgeon Office

- Point of Contact for budget matters within the section.

- Telephone Number. Self Explanatory.

- Status Code. A system code, either "A" for active, or "I" for inactive. This code is needed to allow APCs which are no longer in use (identified by an I) to continue to be linked with budget data to maintain long term historical APC information. The APC code, once entered into the system, is never deleted. Only active APCs (coded A) are displayed when a user requests an APC listing.

The APC Allocation Database contains the following fields:

- APC code. Described above.

- Fiscal Year (FY).

- Quarter. The quarter of the given fiscal year.

- Allocation: The funds allocation for the APC in the first field further delineated by the Fiscal Year and Quarter fields.

The APC Monthly Expenditure Database contains the following fields:

- APC code, as described earlier.

- Fiscal Year of expenditure.

- Month of expenditure.
- Quarter of expenditure, computed from the month field, i.e., if month is 10, quarter is 1.
- Expenditure for the month.

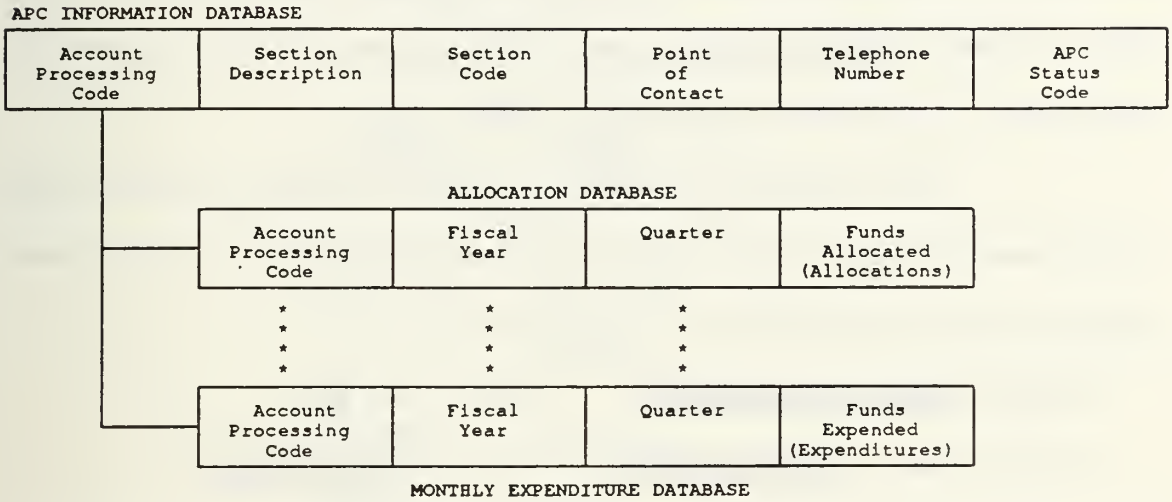


Figure 24. Budget Information System Data Structures

b. Data Inputs

The user will be required to maintain the databases discussed above through three database interfaces. The three interfaces are:

- Enter or delete quarterly allocations.
- Enter or delete monthly expenditures for each section.
- Enter or change the status of a section's APC information.

The menu hierarchy chart is depicted in Figure 25. As discussed in the previous section of this chapter, the user is required to enter the fiscal year to limit the database search. If necessary, the month or quarter within the selected fiscal year is also entered. These entries are standardized as discussed in Section C, General Requirements. All entries within a particular menu cycle are restricted to the user's

chosen fiscal year. This restriction is desired because most data entries will require the same fiscal year since the user usually works in one fiscal year at a time. To change fiscal year while working in the selected menu, the user must return to the main menu and enter the new fiscal year when prompted. The entries within the selected menu cycle are limited to the chosen fiscal year so the user does not have to re-enter the fiscal year for each additional expenditure or similar input.

In the cases where the APC is entered by the user, the system verifies the code entered against the active APC information database and, if the APC is found, confirms the user's choice with the following screen.

Section: [redacted] Section Code: [redacted]

Point of Contact: [redacted] Telephone: [redacted]

This confirmation prevents the entry of either a wrong or inappropriate APCs that would destroy the integrity of the allocation and expenditure databases. If the APC is not found, an appropriate warning is issued to the user and he or she is allowed to try again.

Figure 26 is a picture of the user input screen used for the entry and deletion of a quarter's budget allocation for a given APC. The fiscal year, APC, and quarter have already been entered by the user and will appear on the input screen. This screen is modified when used in the deletion process by the addition of a comment, **Delete this Record? (Y/N)** [redacted] , at the bottom of the screen.

Figure 27 depicts the user input screen that allows the user to enter the monthly expenditures for a particular APC. As discussed previously, the user can only enter the actual allocation for the month. The month and APC have already been

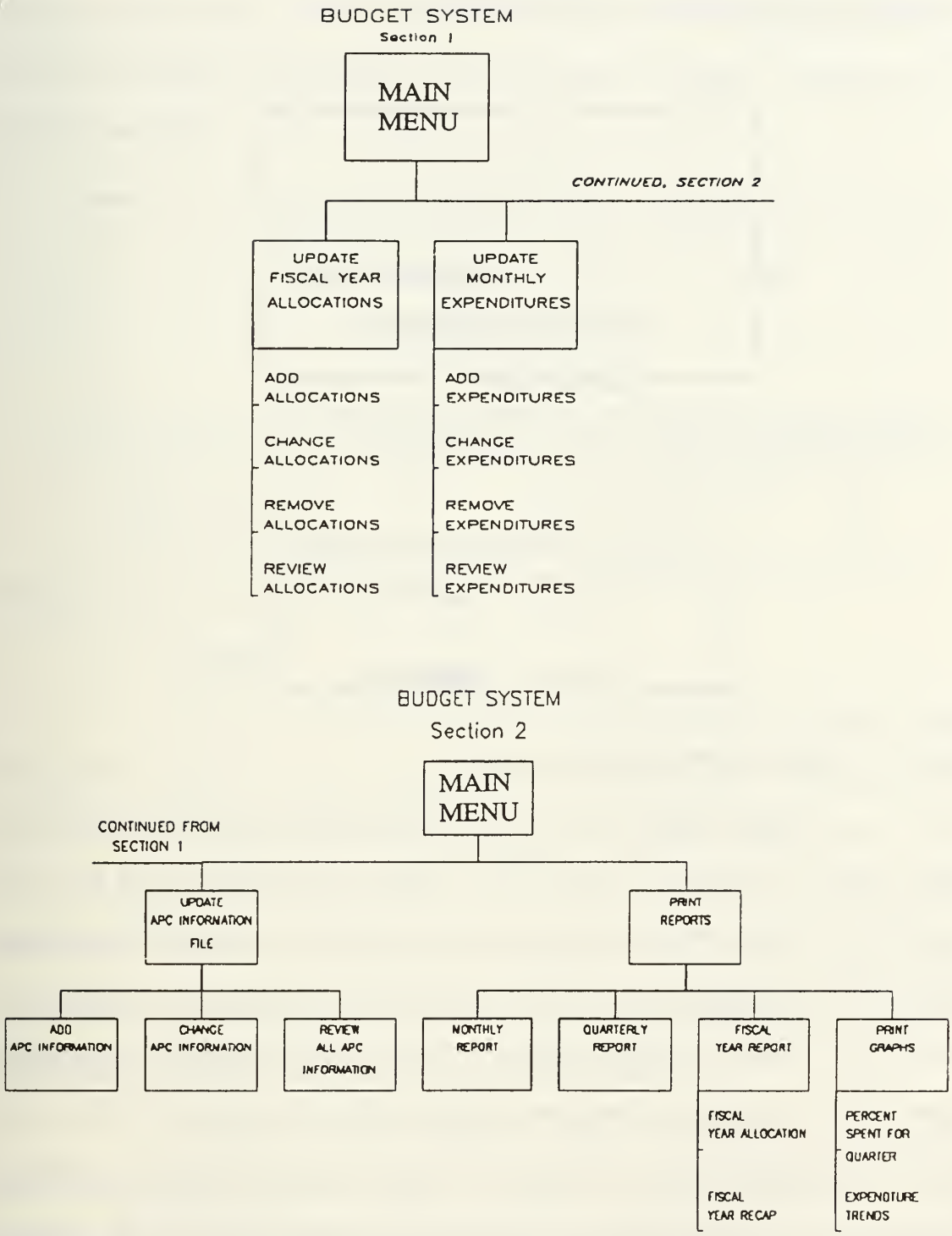


Figure 25. Budget Information System Menu Hierarchy Chart

entered and verified to be correct. This format, modified like the quarterly format, is also used for verification prior to the deletion of a record.

```
Enter the Quarterly Allocations
            for
       Fiscal Year  89

Quarter      1
APC Code     W140
Allocation   ________.__
```

Figure 26. Quarterly Budget Allocation Input Screen

```
Enter the Monthly Expenditure

APC Code     W-156
Month        10
Expenses     ________.__
```

Figure 27. Monthly Expenditure Input Screen

Figure 28 depicts the user input screen that allows the user to enter or change an APC. The entry of a new APC is preceded by verification that the APC requested is not in the current database. If the requested APC is found in the existing database, the user is warned and allowed to try again. The user is not allowed to reenter the APC once the screen in Figure 28 is presented. This prevents redundancy in data entry and keeps the user from circumventing the duplicate APC check procedure. The section codes are displayed on the screen to facilitate user entries. Inactivation of the APC is allowed when the user is prompted with "Do you wish to

put this APC into inactive status? (Y/N) ". If the user wants to change a particular APC's status code to inactive, the APC record is automatically annotated with the new status code. Activation to an active status is automatic when the user first enters a new APC.

```
                    APC Code Entered -> W-140

SECTION                                    Section Code

            Point of Contact

            Telephone Number  (   )-   -
```

SECTION CODES			
Family Practice Clinic	FPC	Consolidated Troop Clinic	CTM
General OutPatient Clinic	GOC	Fort Hunter Liggett Clinic	FHL
CTMC-Family Practice	CFP	Ambulance Section	AMB
Emergency Medical Service	EMS	Flight Surgeon Office	FSO
Presidio of Monterey	POM	Department	DEP

Figure 28. APC Information Input Screen

c. *Outputs*

Outputs are divided into two general categories. Review screens (discussed in Section B of this chapter) and pre-formated reports. The three general review screens presented to the user are depicted in the menu hierarchy chart in Figure 25 as the menu options either to review allocations, expenditures, or all of the APC information. Each review option provides the user with the generic review display as described in Section B of this chapter. The data fields presented in each case are the complete data fields of the respective active database.

(1) Monthly Budget Expenditure Report. Figure 29 is an illustration of the monthly budget expenditure report. This report serves as the Department Chief's indicator of the month to month status of the department's budget. This report is

critical to the monitoring of the section's compliance with the department's budget. This report is also provided to the section chiefs for the same reason.

The user is prompted to enter the fiscal year and month desired prior to the output of this report. The databases and appropriate fields necessary to create the report are listed below.

- APC, extracted from the Monthly expenditure database.
- Section Description. This information is obtained from the combination of the APC database with the Monthly Expenditure database to obtain the title for each APC in the monthly expenditure database.
- Allocation for the quarter. The APC's allocation figure from the allocation database is combined with the monthly expenditure database for the selected fiscal year and quarter.
- Expenditures for the month. This data is derived for each APC from the monthly expenditures database.

The following numbered items, which clarify the calculated fields within the report, correspond with the numbers in Figure 29.

1 This is the fiscal year of the report.

2 This is the month of the report. The numerical month requested is converted to the name of the month, i.e., month 10 becomes October.

3 Quarter of the report.

4 Report date provided by the system.

5 Spent for Quarter. This field is calculated by summing all the monthly expenditures for the specified quarter. For instance, if the monthly report is for November, the system searches the monthly expenditure database and finds all expenditures for the first quarter's months; October, November, and December. (Note: in this example, December's expenditures would be zero.)

Department of Family Practice
Monthly Expenditure Report

Month JULY
Quarter 3

Fiscal Year 89
Report Date 7/20/89

APC INFORMATION		QUARTER				MONTH			
APC	SECTION	ALLOCATED	SPENT	**	PERCENT SPENT	FUNDS PER MONTH	SPENT	**	PERCENT SPENT
W140	PRIMARY CARE	4000.00	3000.00		75 %	1333.33	36.36		03 %
W357	FAM PRAC CL	9000.00	9500.00	**	106 %	3000.00	3100.00	**	103 %
W360	EMERG MED SERVICE	30000.00	5000.00		17 %	10000.00	11000.00	**	110 %
DEPARTMENT TOTALS		43000.00	17500.00		41 %	14333.33	14136.36		99 %

** Indicates an overexpenditure of funds.

Figure 29. Monthly Budget Expenditure Report

6 Flag Field. This field prints a "**" if the amount spent for the quarter or month exceeds the amount allocated for the quarter or month (see Note 8 below). This flag serves as a visual indicator to the reader and highlights probable problem areas.

7 Percent Spent for Quarter. This field is computed by dividing the amount expended so far in the quarter (as determined in Note 5 above) by the allocation for the quarter.

8 Funds per Month. This amount is computed by dividing the quarterly allocations by three to provide monthly allocations for the sections.

9 Percent Spent for Month. This field is computed by dividing the amount expended during the month in question by the Funds per Month (explained in Note 8 above).

(2) Quarterly Report. Figure 30 is an illustration of the quarterly budget expenditure report. This report serves as the Department Chief's indicator of the status of funds for the selected quarter. This report, like the monthly report, is critical in allowing the Department Chief to monitor the sections' compliance with the department's budget. This report is also provided to the section chiefs for the same reason.

The quarterly report is designed to closely resemble the monthly report. This report remains in the same format as the monthly report, but excludes all the fields relating to monthly expenditures.

The user is prompted to enter the fiscal year and the quarter desired prior to the output of this report. The fields required for each record are the same as described in Subsection (1) on the monthly budget expenditure report.

Department of Family Practice
Quarterly Expenditure Report

Month JULY
Quarter 3

Fiscal Year 89
Report Date 07/20/89

APC INFORMATION		QUARTER			
APC	SECTION	ALLOCATED	SPENT	**	PERCENT SPENT
W140	PRIMARY CARE	4000.00	3000.00		75 %
W357	FAM PRAC CL	9000.00	9500.00	**	106 %
W360	EMERG MED SERVICE	30000.00	5000.00		17 %
DEPARTMENT TOTALS		43000.00	17500.00		41 %

** Indicates an overexpenditure of funds.

Figure 30. Quarterly Budget Report

The following numbered items, which clarify the calculated fields within the report, correspond to the numbers in Figure 30.

1 This is the Fiscal Year of the report.

2 This is the quarter of the report.

3 Report date provided by the system.

4 Spent for Quarter. This field is calculated by summing all the monthly expenditures for the requested quarter. For instance, the system searches the monthly expenditure database and finds all expenditures for the selected quarter's months, for each APC.

5 Flag Field. This field prints a "**" if the amount spent for the quarter exceeds the amount allocated for the quarter. This flag serves as a visual indicator to the reader and highlights probable problem areas.

6 Percent Spent for Quarter. This field is computed by dividing the amount expended so far in the quarter (as described in Note 4 above) by the allocation for the quarter. This process is repeated for each APC.

(3) Fiscal Year Allocation Report. Figure 31 is a representation of the Fiscal Year Allocation Report. This report shows the allocation for each APC for each quarter in the user selected fiscal year. This report also shows the percent change between the previous fiscal year's allocation and the selected fiscal year's allocation. This report provides the Chief with a quick look at the relative allocations for each of his sections compared with fund allocations from the previous fiscal year.

FISCAL YEAR ALLOCATION REPORT
FY 89

DEPARTMENT OF FAMILY PRACTICE &
COMMUNITY MEDICINE (TDA)

11 MAR 89

APC	SECTION	ALLOCATION QUARTER 1	CHANGE	ALLOCATION QUARTER 2	CHANGE	ALLOCATION QUARTER 3	CHANGE	ALLOCATION QUARTER 4	CHANGE	TOTAL FOR FISCAL YR	CHANGE
W140	PRIMARY CARE	1000.00		516.00		516.00		518.00		2550.00	
W145	C, FAM PRAC	8000.00		2000.00		2000.00		2000.00		14000.00	
W357	FAM PRAC CLINIC	14000.00	-0.11	8000.00	-0.50	8000.00	-0.50	8000.00	-0.50	38000.00	-0.40
W358	CTMS-FPC	10000.00	1.77	6000.00	1.06	6000.00	1.06	6000.00	1.06	28000.00	1.24
	TOTALS	119200.00	1.04	70266.00	-0.39	70266.00	-0.39	70268.00	-0.39	330000.00	-0.29

OTHER SECTIONS REPORTED HERE

Figure 31. Fiscal Year Allocation Report

The user is prompted to enter the fiscal year prior to the output of this report. The fields required for output of this report include:

- APC.
- Section Description.

- Allocations. For each APC for the current year.
- Allocations. For each APC for the previous year.

The following numbered items, which clarify the calculated fields within the report, correspond with the numbers in Figure 31.

1 This percentage reflects the percent change between the previous fiscal year's allocation and the currently selected fiscal year allocation.

2 Totals for the department. This number reflects the total allocation for the department for each quarter in the selected fiscal year. This figure is calculated from totaling all quarter allocations for all of the APCs within the APC Allocation Database.

3 In the cases where an APC did not exist in a prior year, the percentage change field (as described in Note 1) is left blank.

(4) Fiscal Year Recap. Figure 32 provides an illustration of the Fiscal Year Recap Report. This report serves as the Department Chief's indicator of the year's funds status for the department. This report is critical in allowing the Department Chief to analyze each section's compliance with the imposed funds limitations. Throughout the year, this report can provide a quick look at the current status of funds remaining to fulfill the needs for the rest of the fiscal year.

Department of Family Practice
FISCAL YEAR RECAP REPORT

Fiscal Year : 89 Report Date : 7/20/89

APC INFORMATION		FISCAL YEAR 89				RECAP	
APC	SECTION	ALLOCATED	SPENT	**	PERCENT SPENT	UNDER COMMITTED THIS FY	OVER COMMITTED THIS FY
W140	PRIMARY CARE	16419.00	1091.43		6 %	15532.57	
W357	FAM PRAC CL	62600.00	62759.02	**	101 %		159.02
W358	CTMC-FPC	15500.00	5630.03		36 %	9869.97	
W360	EMERG MED SERV	124000.00	107972.58		87 %	16027.42	
DEPARTMENT TOTALS		538719.00	459885.82		85 %	78833.42	

** Indicates an overexpenditure of funds.

Figure 32. Fiscal Year Recap Report

The user is prompted to enter the fiscal year desired prior to the output of this report. The fields required for output of this report include:

- APC.
- Section description.
- Allocation for the quarter.
- Expenditure for the month.

The following numbered items, which clarify the calculated fields within the report, correspond with the numbers in Figure 32.

1 Allocated Funds for FY. This number represents the allocation for each APC in the allocation database for the selected fiscal year. This number is computed by totaling all quarter's allocations within the selected fiscal year for each APC.

2 Total Spent this FY. This represents the total amount spent in the selected fiscal year for the APC . This number represents a total of all monthly expenditures for the selected fiscal year in the monthly expenditure database.

3 Uncommitted Funds this FY. This number represents the difference between Allocated Funds for FY (Note 1) and Total Spent FY (Note 2).

4 Over Committed this Fiscal Year. This column is printed when the uncommitted funds are negative in the preceeding column (Note 3). It serves to flag overcommited sections within the department.

5 Percent Spent FY . This column is calculated by dividing the Total Spent this FY figure (Note 2) by the Allocated Funds for FY figure (Note 1).

6 Department Totals. These numbers, with the exception of Percent Spent (Note 5), are totals of the respective column above the numbers. The Percent Spent figure is the total spent for the fiscal year divided by the total allocated funds.

(5) Percent Spent For Quarter Graph (see Figure 33). This report provides the Department Chief with a graphical portrayal of the funds remaining for each APC for a selected quarter. This graph provides a visual picture of the current status of all of the APC's expenditures.

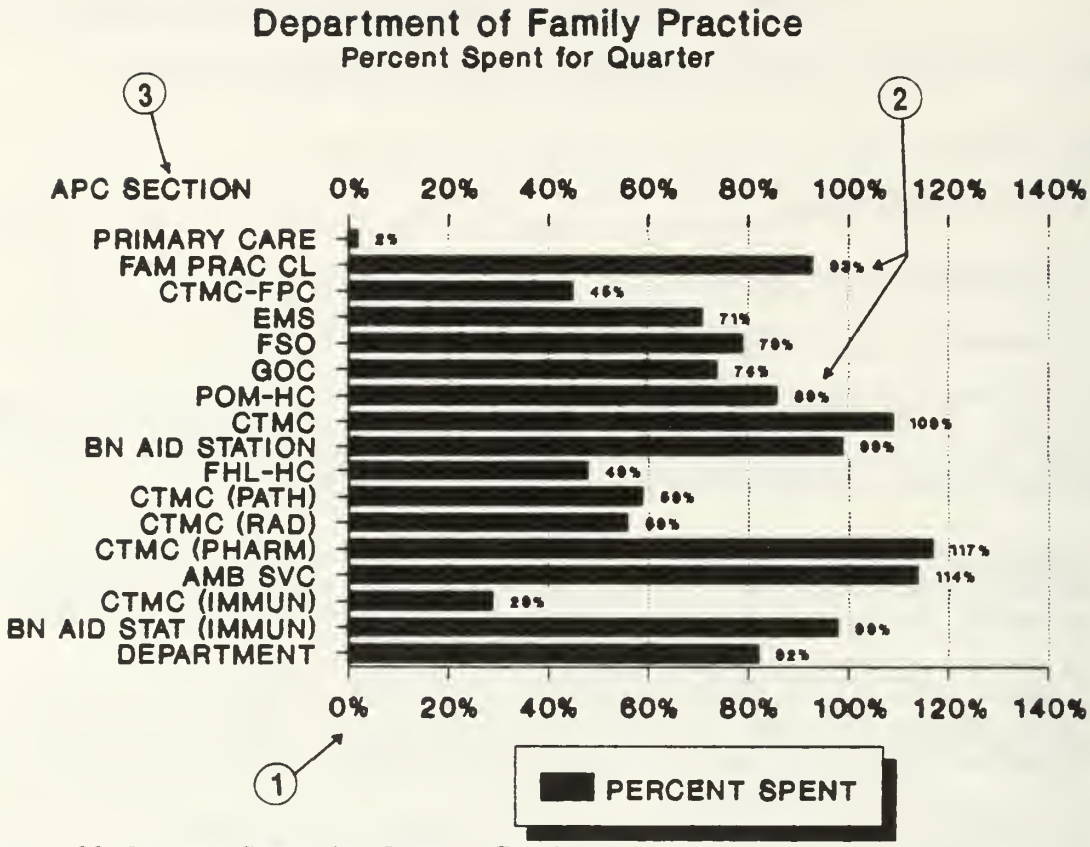


Figure 33. Percent Spent for Quarter Graph

The user is prompted to enter the fiscal year and quarter desired prior to output of this report. This report requires the following fields to be completed:

- APC.
- Section description.
- Total Expenditures for the quarter for each APC
- Allocation for the quarter for each APC .

The following numbered items correspond to the numbered items in Figure 33:

1 The X-axis represents the APC's expenditures for the quarter on a scale from 0 to 100 percent of the amount allocated for the section.

2 The actual computation of this percentage comes from dividing the total expenditures for a section by the allocation for that section.

3 APC's active in the selected quarter are reported along the Y-axis.

(6) Trend Analysis Graph (see Figure 34). These two graphical pictures provide the Chief with a look at the current trend in expenditures for the current year and the trends for the two previous years. The expenditures are compared to the allocations for the respective fiscal years. This report will be used to report and track the overall budgetary trends within the department for the current fiscal year. This report can be called up at any time during the current fiscal year.

The user is required to enter the fiscal year prior to output of this report. The data fields necessary to create this report include:

- Total Allocation for all APCs for each quarter within the selected fiscal year.
- Total expenditures for all APCs for each month within the selected fiscal year. This will not be graphed but serves as the building block for the graphing of this data on a cumulative basis.

A calculated cumulative total for each of the above data fields is required to create these two graphs. As depicted in Figure 34, one line is graphed to represent the cumulative total of each quarter's allocation. The second line represents the cumulative total expenditures for each month.

The following numbered items correspond with Figure 34.

1 This line reflects the cumulative total for the total allocations for all APC's reported for the selected fiscal year in the APC Allocation Database.

2 Each tick mark on the line corresponds to the actual total expenditure for all APCs for the given month on the X axis.

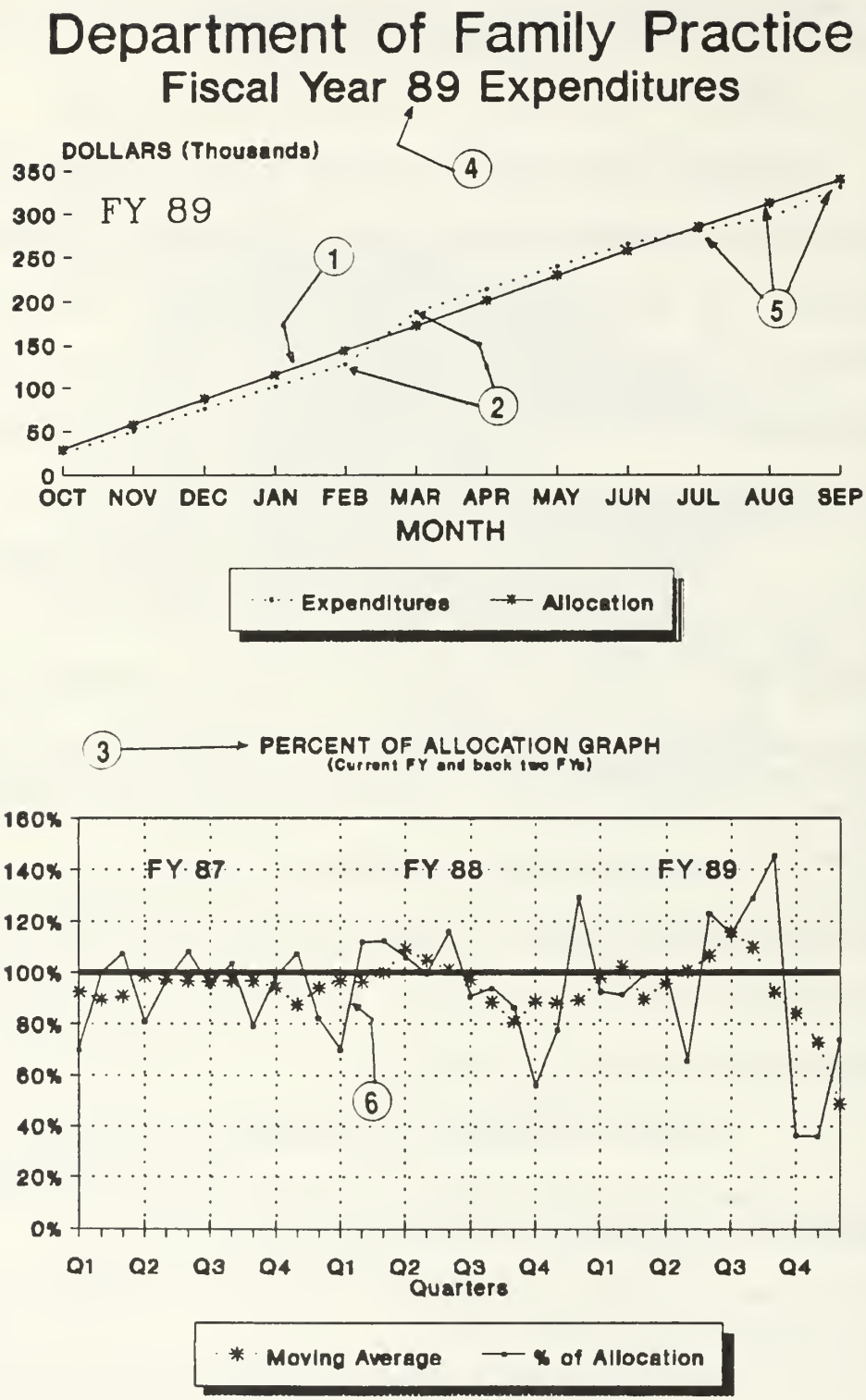


Figure 34. Trend Analysis Graph

3 This graph represents a long term trend analysis of department wide expenditures. The system uses the current fiscal year's expenditures and the two previous year's expenditures to create this graph

4 The fiscal year of the information graphed.

5 Quarter allocations are plotted on the FY graph by dividing the quarterly allocation into three equal monthly allocations (done within the department). These monthly allocations are then graphed on a cumulative basis.

6 The percent of allocation is computed by dividing the expenditures for the month by the allocation for the month.

2. Equipment Information System (see Program, Appendix D)

Figure 35 is the UCD describing the proposed Equipment Information System. As shown in the diagram, initial equipment requirements are identified with the department's Resource Information Report (RIR). The RIR is shown in Figure 36. This report is completed by the sections and submitted to the department NCOIC. In addition to new equipment requirements, the RIR is also the medium for updating previously submitted equipment requirements. The information contained in the RIR is used by the department to update the equipment procurement database. As shown in Figure 36, the RIR is also the medium for collecting section personnel information, i.e., gains, losses, and changes. The personnel portion of the RIR is discussed in Section 3, Personnel System.

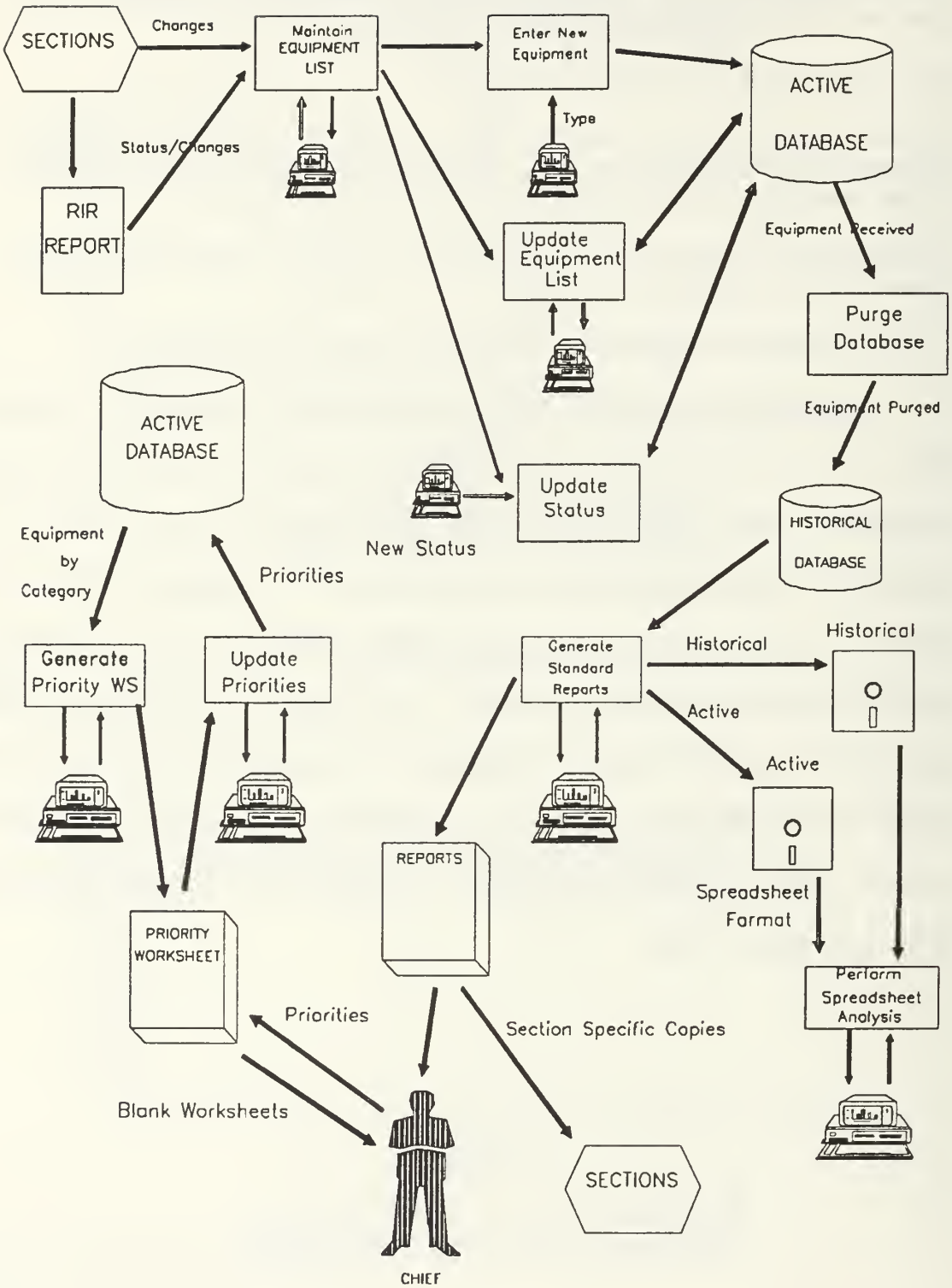


Figure 35. Equipment Information System User Concept Diagram

DEPARTMENT OF FAMILY PRACTICE AND COMMUNITY MEDICINE
RESOURCE INFORMATION REPORT (RIR)

SECTION—(check one)
FPC__ EMS__ CTM__ FHL__ GOC__ CFP__ POM__ AMB__ FSO__ ___ __

1. PERSONNEL
a. Losses (changes additions to previous report)

ID CODE	NAME	RANK	LOSS DATE	P	A	COMMENTS

b. Gains (Attach completed personnel information sheet)

TDA PARA	TDA LINE	TDA POS	NAME (last,first)	RANK	RES STATUS	EXC?	COMMENTS

c. Changes to Current TDA (other than losses or gains)

OLD POSITION					NEW POSITION			
PARA	LINE	POS	NAME	RANK	PARA	LINE	POS	REASON

2. EQUIPMENT
a. Status Update (Items currently on list)

DEPT CODE	ITEM	NEW QTY	NEW COST	NEW STAT	COMMENTS

STATUS—CODE
PW...Paperwork
RC...Received
OO...On Order
RM...RMD Proc
AP...Approved

b. New Equipment Requirements

REQ DATE	ITEM	TYPE REQ	URG	QTY	UNIT PRICE	STATUS CODE	COMMENTS

TYPE REQUEST	
MEDC	MEDCASE
CEEP	CEEP
CAPR	CAPR
OTHE	Other

URGENCY CODE	
0	Needed Now
1	1 Year
2	2 Years
3	3 Years
4	Not Urgent

3. COMMAND INTEREST

a. List 3 things going well.

b. List 3 things being worked on.

c. List any thing that may require the assistance of the chief.

Figure 36. Resource Information Report (RIR)

a. Data Structures

The Equipment System consists of two databases. The primary database maintains the active department equipment requirements and contains the following data fields:

- Equipment Code Number. This number, assigned by the system, uniquely identifies each equipment item in the database.
- Section Code. Explained in Section 1, Budget System.
- Date of Request. The date equipment is requested by the section.
- Item Description. This is a short description of each equipment item identified in the database.
- Type of Request. The equipment requested will be one of four types, MEDCASE, CEEP, CAPR, or other as described in Chapter IV.
- Priority. The priority number is a ranking of all of the equipment to indicate the relative priority of each. The Department Chief assigns the priority to all department equipment using the priority worksheet described in the Outputs section below.
- Urgency Code. The urgency code indicates how soon the equipment is needed by the section.
- Quantity.
- Unit Price.
- Extended Price. Quantity * Unit Price.
- Status of Procurement. The status of the procurement is indicated by one of five codes to show where each equipment request is in the procurement process. The five codes and their meaning are listed below:

PW	Paperwork is being prepared by the section requesting the equipment.
RM	RMD is processing the equipment request.
AP	RMD has approved the equipment procurement.
OO	The section as put the equipment on order.
RC	The equipment has been received by the section.

- Comments.

The second database maintains the historical information on equipment previously procured by the department and consists of the following data fields:

- Section Code.
- Item Description.
- Type of Request.
- Quantity.
- Extended Price.
- Date of Request. Taken from primary database described above.
- Transfer Date. The date the item was transferred to the historical database (upon receipt of the equipment).
- Months to Complete Procurement. The difference between the date of request and the transfer date.
- Comments.

b. Data Inputs

The Equipment System menu hierarchy chart is shown in Figure 37. The menu system allows the user to update the equipment database, print reports, and archive completed equipment procurements in the historical database. Users enter new equipment requirements into the primary equipment database using the input screen shown in Figure 38. This screen presents all of the data fields necessary for user input and displays the various codes needed for the specific data fields.

To change or remove equipment from the database, the user selects the appropriate menu item and is then prompted to enter the equipment code number or the section code to identify the equipment to be changed or removed. If the user does not know the equipment code number, he or she can enter the section code. A list

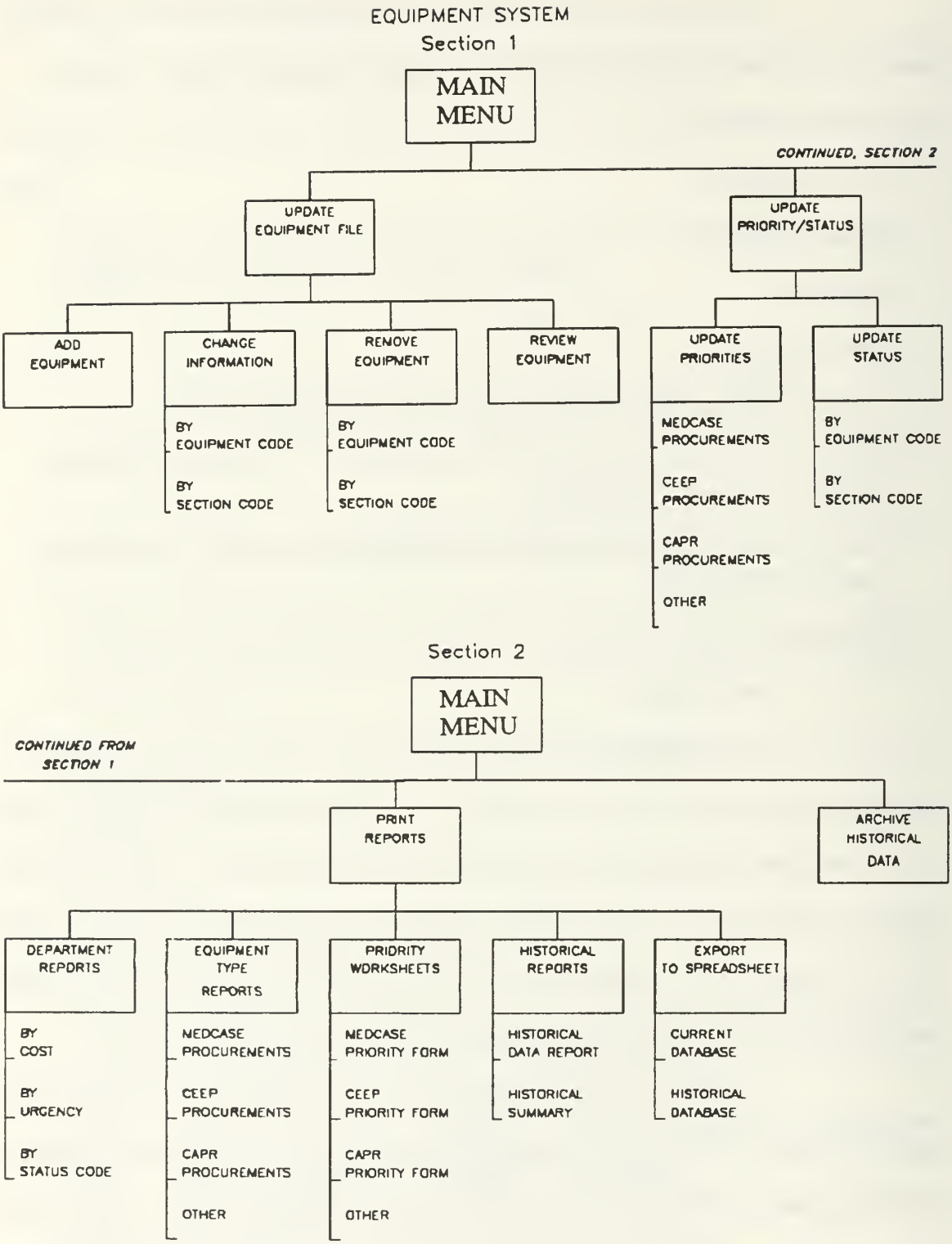


Figure 37. Equipment Menu Tree

of all equipment requirements for that section is presented. The user is then asked to enter the record number (displayed to the left of each equipment item) of the desired equipment record to change. When changing equipment data, the user is presented with the same screen discussed above for new data entry.

```
E N T E R   N E W   E Q U I P M E N T   D A T A

                    EQUIPMENT CODE #

SECT   DATE      ITEM DESCRIPTION        TYPE   URGENCY   QTY    UNIT PRICE
                                                                  $

                STATUS CODE                COMMENTS
```

URGENCY CODES	
0	Needed Now
1	1 Year
2	2 Years
3	3 Years
4	Not Urgent

TYPE OF REQUEST CODES	
MEDC	MEDCASE
CEEP	CEEP
CAPR	CAPR
OTHE	OTHER

STATUS CODES	
PW	Paperwork
RM	RMD Process
AP	Approved
OO	On Order
RC	Received

Figure 38. Equipment Input Screen

The user is allowed to update the priorities on the equipment list. Priority changes are obtained from the priority worksheet (discussed in the Output section below). The Department Chief reviews all equipment requests and completes the priority worksheet to identify overall department priorities. The database is then updated with the new priorities. After selecting the equipment, the user is presented with a review screen similar to that described in Section C of this chapter. The fields displayed correspond to the priority worksheet to simplify user input and are listed below:

- Equipment Code Number.
- Type of Request.
- Section Code.

- Item Description.
- Urgency Code.
- Priority. The Department Chief's numerical ranking for the item.
- Quantity.
- Unit Price.

The user is allowed to enter the changes directly to the review screen. When equipment status changes, e.g., an equipment requisition is submitted or equipment is received, the sections are required to indicate this on the RIR and submit it to the department NCOIC. These status changes are then entered into the database using the input screen shown in Figure 39. This screen is similar in format to the Status Update section on the RIR to simplify user data entry.

```
                              SECTION    FPC
____________________________________________________________________________

  EQUIP CODE     ITEM DESCRIPTION      QTY    UNIT PRICE   STATUS
   9010.01       BREAST PUMP            2      1300.00      PW

                              COMMENTS
                              [                          ]
```

Press ESC to abort editing, ENTER to complete changes.

Figure 39. Status Update Screen

c. Outputs

(1) Review Equipment List. The format of the review screen is discussed in Section B above. All of the equipment database fields are listed on the review output screen. The user can scroll left and right, up and down, to view or change all fields for each record.

(2) Department Equipment Report (see Figure 40). The department equipment report is a complete equipment requirements listing for the department. All of the fields in the equipment database are used to produce this report. The user is allowed to choose one of three sort options. The flexibility to select the sort option makes it easier to highlight those aspects of equipment procurement most important to the Department Chief. Each sort option is discussed below:

- Sorting by Cost. The equipment list is sorted by the extended price field, from high values to low.

- Sorting by Urgency. The equipment list is sorted by the urgency code, from zero (0) for immediate equipment requirements to four (4) for non-urgent requirements. Within each urgency code section the equipment is further sorted by section code and extended price (from high to low).

- Sorting by Status. The status sort option groups the equipment information by each of the five status codes. Each group is further sorted by section code and extended price (from high to low).

TYPE SORT: COST (2) (3) DEPARTMENT EQUIPMENT REPORT (1) DATE: 7/20/89

EQ CODE	SECT	REQ DATE	DESCRIPTION	TYPE REQ	PRI	URG	QTY	UNIT PRICE	EXTENDED PRICE	ACCUMULATED TOTALS	STAT	COMMENTS
9011.01	FPC	01/10/89	BEDPAN	MEDC	2	1	2	5200.00	10400.00	10400.00	FW	
9025.20	EMS	01/20/89	SPIT CUP	OTHE	5	2	5	1000.00	5000.00	15400.00	OO	BACKORD
836[illegible].89	CTM	12/15/88	MICROCOMPUTER	CAPR	9	1	1	3000.00	3000.00	18400.00	OO	BACKORD
9101.60	CFP	04/10/89	GAMMA CAMERA	CEEP	4	1	1	1000.00	1000.00	19400.00	AP	

(4)

Figure 40. Department Equipment Report

The following numbered items correspond to the numbers in Figure 40 and explain certain portions of the report.

1 The system date is printed at the top of the report.

2 The type of sort indicates how the equipment list has been sorted, by COST, URGENCY, or STATUS.

3 The format of the fields listed across the top remains the same regardless of the sort option chosen.

4 The cumulative total is calculated by adding each successive extended price to the previous cumulative total.

(3) Equipment Type Report (see Figure 41). The equipment type report is a listing of the equipment requirements for one of the equipment types, either MEDCASE, CEEP, CAPR, or OTHER. The user selects the type of equipment he or she wants listed from the menu. All of the fields in the equipment database are used to produce this report. The user is allowed to choose one of two sort options. Each sort option is discussed below:

- Sorting by Cost. The equipment list is sorted by the extended price field, from high values to low.
- Sorting by Priority. The equipment list is sorted by the priority code, from one for highest priority to the lowest existing priority in the database. Within each priority section the equipment is further sorted by section code and extended price (from high to low).

TYPE EQUIPMENT: CEEP (2) (3) EQUIPMENT TYPE REPORT (1) DATE: 7/25/89

PRI	SECT	REQ DATE	DESCRIPTION	URG	QTY	UNIT PRICE	EXTENDED PRICE	ACCUMULATED TOTALS	STAT	COMMENTS
1	FPC	01/10/89	INSUFFLATOR	1	2	4800.00	8800.00	8800.00	PW	
2	EMS	01/20/89	MICROTOME	2	5	4990.00	24950.00	33750.00	OO	BACKORD
3	CTM	12/15/88	FLURO-LITE	1	1	1149.00	1149.00	34899.00	OO	BACKORD
4	CFP	04/10/89	PLASMA BATH	1	1	1500.00	1500.00	36399.00	AP	

(4)

Figure 41. Equipment Type Report

The following numbered items correspond to the numbers in Figure 41 and explain certain portions of the report.

1 The system date is printed at the top of the report.

2 The type of equipment indicates which equipment type is listed in the report, either MEDCASE, CEEP, CAPR, or OTHER.

3 The format of the fields listed across the top remains the same regardless of the sort option chosen.

4 The cumulative total is calculated by adding each successive extended price to the previous cumulative total.

(4) Equipment Priority Worksheet (see Figure 42). The priority worksheet is used by the Department Chief in a meeting with each of his section chiefs. In this meeting, the priority of all of the department's equipment requirements is determined and annotated on the priority worksheets for each equipment type. These worksheets are then used to update the priorities in the equipment database.

Type: OTHER (2) EQUIPMENT PRIORITY WORKSHEET (1) Date 7/20/89

EQ Code	Sect	Item Description	Pri	Urg	Qty	Unit Price	Extended Price	Comments	Updated Requirements New Qty	New Pri	Comments
9010.01	FPC	MICROSCOPE	3	0	3	1000.00	3000.00				
9020.02	FPC	ULTRASOUND,PORT		1	1	2500.00	2500.00				
9045.10	EMS	BREAST PUMP	10	2	5	200.00	1000.00				
9020.07	CTM	ENDOSCOPE	99	4	1	500.00	500.00				

(3)

Figure 42. Equipment Priority Worksheet

The data fields necessary to produce the priority worksheet are listed below:

- Type of Equipment.
- Equipment Code Number.
- Section Code.
- Item Description.
- Priority.
- Urgency Code.
- Quantity.
- Unit Price.
- Extended Price.
- Comments.

The following numbered items correspond to the numbers in Figure 42 and explain certain portions of the report.

1 The system date is printed at the top of the report.

2 The type of equipment indicates which equipment type is listed in the report, either MEDCASE, CEEP, CAPR, or OTHER.

3 A fill in section is provided to allow the Department Chief to enter the updated priorities.

(5) Equipment Historical Report (see Figure 43). Once equipment is received, the data referencing it can be archived from the primary equipment database to the historical database. All of the historical database fields are used to produce the equipment historical report. The report can be sorted either by section or by equipment type. Within each of these sort options the list is further sorted by the extended price field, from high to low.

TYPE SORT: SECTION EQUIPMENT HISTORICAL REPORT (2) DATE: 7/20/89

SECT	REQ TYPE	DESCRIPTION	URG	QTY	EXTENDED PRICE	REQ DATE	ARCHIVE DATE	MONTHS TO COMPLETE	COMMENTS
FPC	MEDC	BEDPAN	1	2	10400.00	01/20/89	03/20/89	2	
FPC	OTHE	SPIT CUP	2	5	5000.00	03/20/89	05/25/89	2	
Subtotals					(3) 15400.00				
CTM	CAPR	MICROCOMPUTER	1	1	3000.00	04/13/89	05/13/89	1	
Subtotals					3000.00				
CFP	CEEP	GAMMA CAMERA	1	1	1000.00	11/12/88	02/12/89	4	
Subtotals					1000.00		(1)		

Figure 43. Equipment Historical Report

The following numbered items correspond to the numbers in Figure 43 to explain the report information.

1 The transfer date is automatically entered into the database using the system date when the data is archived.

2 The months to complete the procurement are calculated by subtracting the transfer date from the original request date.

3 Subtotals for each section or equipment type group are shown for the extended price field and is obtained by totaling the extended prices for the respective group.

(6) Historical Summary Report (see Figure 44). The historical summary report displays summary statistical information about the data in the historical database. The Department Chief can use the summary report to determine the department's history of equipment procurement in terms of the number of equipment requests, average costs of the equipment requested, the type of equipment requested, and the average length of time to obtain equipment. The historical database fields necessary to create the summary report are listed below.

- Section Code.
- Type of Request.
- Quantity.
- Extended Price.
- Date of Request.
- Transfer Date.
- Months to Complete Procurement.

The following numbered items correspond to the numbers in Figure 44 and explain the method used to produce the summary report information.

1 The earliest date of request and the latest date of request contained in the database are listed at the top of the report.

2 The total number of requests for each type of equipment are calculated by adding the total quantities of equipment procured for each equipment type.

3 The average cost of each equipment type is calculated by dividing the total extended price for the equipment type group by the total number of requests for that equipment type group.

4 The average time to complete an equipment procurement is calculated by averaging all of the figures for the number of months to complete each procurement for each equipment type.

5 The total number of requests for each type of equipment is summed for each section.

6 The average cost for each type of equipment is calculated for each section by dividing the total cost of the equipment type requests for a section by the total number of requests for that equipment type for the section.

HISTORICAL SUMMARY REPORT

1 EARLIEST REQ DATE: 1/13/88
LATEST REQ DATE: 7/20/89

REQUESTS BY TYPE

TYPE REQUEST	# REQUESTS	AVG COST	AVG MONTHS TO COMPLETE
CAPR	25	7500.00	3.1
MEDC	78	3500.00	2.5
CEEP	52	11000.00	4.7

2 3 4

REQUESTS BY SECTION

SECTION	# MEDCASE	# CEEP	# CAPR	# OTHER
FPC	25	13	7	10
CTM	14	11	6	5
GOC	1	2	0	2
EMS	1	0	0	3

5

AVERAGE COST BY SECTION

SECTION	AVG MEDCASE	AVG CEEP	AVG CAPR	AVG OTHER
FPC	4400.00	13000.00	8500.00	2900.00
CTM	3700.00	9000.00	3400.00	3000.00
GOC	3400.00	6500.00	0.00	2700.00
EMS	3000.00	0.00	0.00	2650.00

6

Figure 44. Historical Summary Report

3. Personnel Information System (see Program, Appendix E)

Figure 45 is the user concept diagram for the personnel information system. This system interfaces the four major personnel subsystems identified in Chapter IV. These information subsystems include:

- Department Personnel Information Subsystem (including personal data).
- Table of Distribution and Allowances Subsystem.
- Leave and Absence Recordkeeping Subsystem.
- Continuing Medical Education (CME) Budget Subsystem.

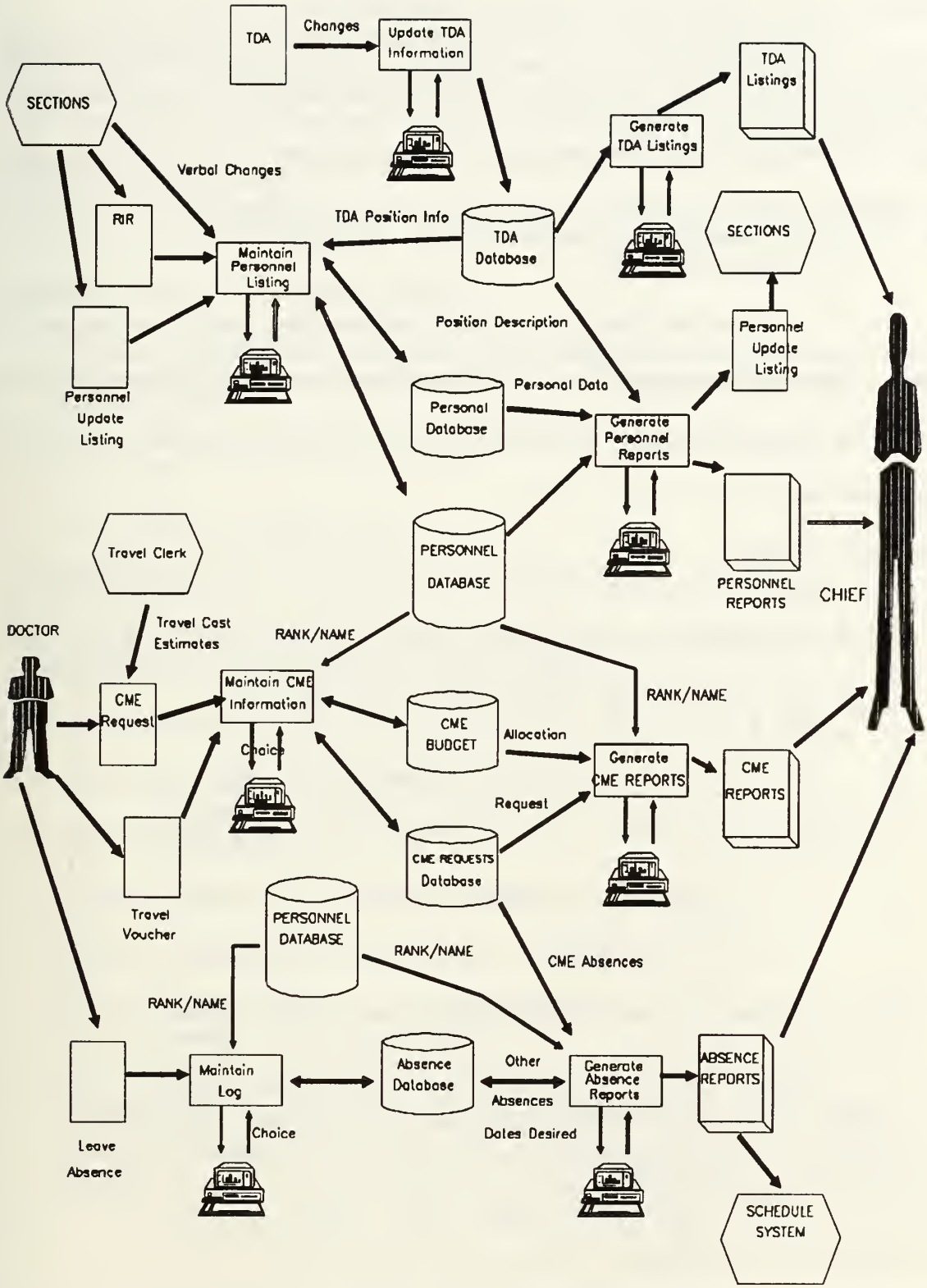


Figure 45. Personnel Information System User Concept Diagram

The consolidation of all four personnel subsystems under one major system simplifies the transfer and maintenance of the six data files necessary to maintain the data. All personnel inputs, processing, and outputs are captured within a single series of operations without requiring the user to leave the current application environment.

a. Data Structures

Figure 46 depicts the various database files required to support the personnel information system. This figure shows how the file that represents a person within the department serves as the pivotal point for the interrelation of all of the personnel files.

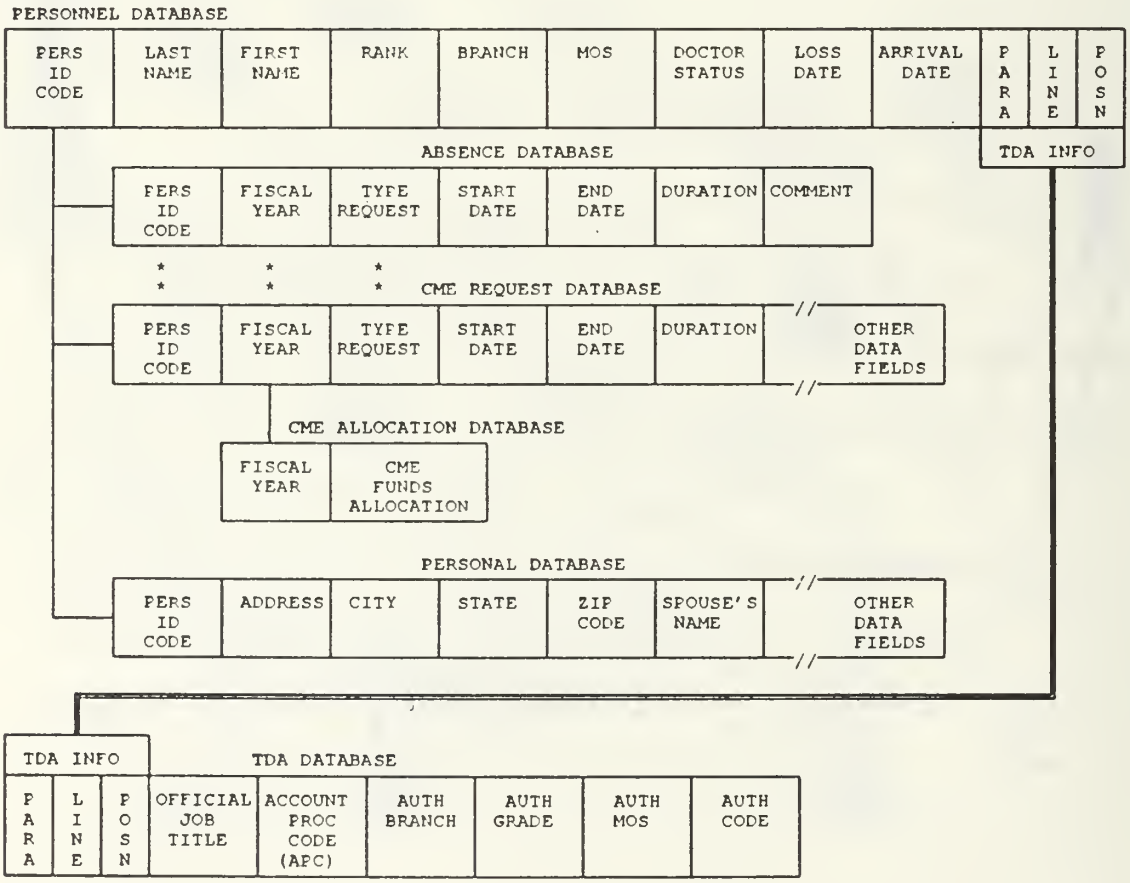


Figure 46. Personnel Data Structures

The key field identified throughout the database is the Personnel Identification Code as described below. This code is already used in the current system. It is recognized as the method by which personnel data should be maintained throughout the department.

The personnel file, which represents an individual assigned to the department, contains the following fields:

- Personnel Identification Code. This code is derived from the first letter of an individual's last name, combined with the last four numbers of their social security number.
- Last Name.
- First Name and Middle Initial.
- Rank.
- Branch of Service (accepted military abbreviations e.g., Medical Corps (MC), Army Nurse Corps (AN), etc.).
- Military Occupational Specialty Code.
- Arrival Date within the Department.
- Anticipated Date of PCS (if known).
- Currently assigned TDA Paragraph Number.
- Currently assigned TDA Line Number.
- Currently assigned TDA Position Number. If the person is carried as excess, this number will be 99.
- Doctor Status (if appropriate). This code serves to track only the current training status of doctors in the residency program. The codes used are; (1) Third Year Residency, (2) Second Year Residency, (3) First Year Residency (Student).

The personal information database file serves as the repository of sensitive information about an assigned individual. Each record contains:

- Personnel Identification Code. This code serves to relate this file to the personnel file.
- Local Home address.
- City of Home address.
- State.
- Spouse's first name (if appropriate).
- Children's names, followed by their ages (if appropriate).
- Home telephone number.
- Date of rank.
- Personal Comments.

The Table of Distributions and Allowances (TDA) database file reflects the current positions available as obtained from the most up to date TDA for the department. Each record contains the following fields:

- TDA Paragraph Number.
- TDA Line Number.
- TDA Position Number.
- TDA Official Job Title.
- The APC that relates to this particular position.
- The authorized branch of service of this position.
- The authorized rank or grade for this position.
- The authorized Military Occupational Specialty for this position.

- Authorized field. This field is used to determine if the position is an authorized position under the current TDA. This position could actually be required under the TDA but not authorized under peacetime conditions. This is a common occurrence in TDAs in the military.

The Continuing Medical Education funds allocation database records the CME allocation for each fiscal year. Each record contains the following fields:

- Fiscal Year.
- Allocation for the fiscal year in dollars.

The Continuing Medical Education request database records the doctors' requests for CME funded education. Each doctor can have several active CME requests within this database. Each record contains the following fields:

- Personnel Identification Code.
- Fiscal Year of the request.
- Type Request. The CME request can be one of the following types of requests: (C) Conference/Meeting Travel, (G) General Mission Travel, (B) Board Certification.
- Start Date of Travel.
- End Date of Travel.
- Duration of travel. This field is computed by determining the number of days between the start date and the end date. This data is used in the statistical summary reports described in Section 3.c, Outputs, below.
- Location or Destination.
- Purpose of travel. The title of the conference or the specific purpose of the request.
- Travel Mode. Travel can either be by (A) aircraft, (P) privately owned vehicle, or (G) government provided ground transportation. This is used in the computation of the costs involved in the travel.

- Travel cost (Actual or estimated cost depending on the Costing Code described below).

- Per Diem Cost (Actual or estimated cost depending on the Costing Code described below).

- Registration Fee for the Conference (Actual or estimated cost depending on Costing Code described below).

- Reimbursable expenses (Actual or estimated cost depending on Costing Code described below).

- Total Cost of travel. This field is calculated by adding the Travel cost, Per Diem cost, Registration Fee, and Reimbursable expenses fields (Actual or estimated total cost depending on the Costing Code of the related fields).

- Costing Code. This code differentiates between an estimated total cost and the actual costs. The actual costs are identified once the travel has been completed and the travel claim voucher is received by the department.

The Absence database maintains the record of all requested leaves or other absences, e.g., permissive TDY, emergency leave. This database does not record the CME requests discussed in the CME request database section. Each record contains the following fields:

- Personnel Identification Code.

- Fiscal Year of request.

- Type of request. (L) Ordinary Leave, (P) Permissive TDY, (E) Emergency Leave, (S) Sick Leave or Convalescence leave, (T) Temporary Duty, or (O) other type of unspecified absences.

- Start Date of Absence.

- End Date of Absence.

- Duration of absence. This field is computed by determining the number of days between the start date and the end date.

- Comments on special circumstances.

b. Data Inputs

The Personnel Information System menu hierarchy chart is shown in Figure 47. This menu system allows the user to update the personnel system databases in the following areas:

- Add, change or remove records in the personnel and personal database.
- Add, change or remove records in the Table of Distributions and Allowances database.
- Update the Personnel Files from information provided on the Resource Information Report explained in the equipment information system Section (2).
- Add, change, or remove records in the Continuing Medical Education request and funds allocation databases. The user can also print the two required reports for CME fund monitoring.
- Add, change or remove records from the absence database.

The following sections describe the major data entry requirements for the personnel system. The common data entry requirements are described in the first section. This description is followed by the data input requirements for each of the major input submenus depicted in Figure 47.

(1) Common Input Requirements. In most of the submenus, the user is required to enter a personnel identification code (PIC). The standardized entry screen discussed in Section C.2.a, Input Screens, is used for this input. The system then verifies the PIC entered against the personnel file. If the PIC is found in the database, the user is presented with the following confirmation screen.

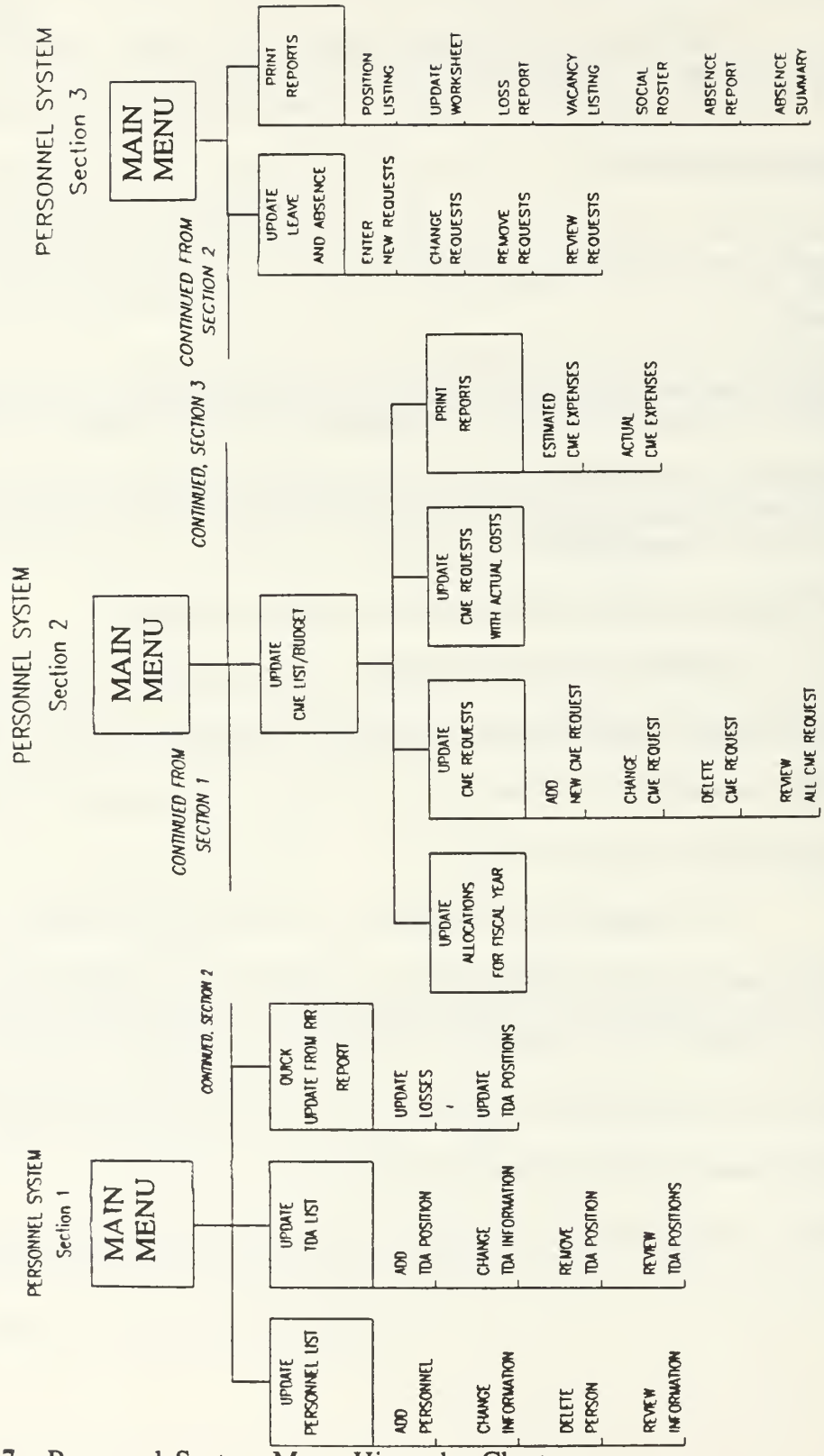


Figure 47. Personnel System Menu Hierarchy Chart

THIS IS THE PERSON WHOSE ID CODE IS [redacted]

LAST NAME [redacted] FIRST NAME [redacted] RANK [redacted]

OCCUPYING TDA PARAGRAPH [redacted], LINE [redacted], POSITION [redacted]

<<<<<<<<SYSTEM MESSAGE DEPENDING ON TYPE OF REQUEST>>>>>>>>

This confirmation screen allows the user to determine if the requested PIC is correct. This type of confirmation prevents the user from entering a wrong or inappropriate PIC that would destroy the integrity of the database. If the identification code is not found, a warning, "ID Code not found! Press return to continue...", is displayed. The system then gives the user the option to search for a PIC by entering the last name of the person. All records with the requested last name are displayed as shown below and the user is allowed to pick the identification code of the correct person from the list.

LAST NAME	FIRST NAME	ID CODE
SMITH	JOHN E.	S2356
SMITH	BECKY K.	S9999

ENTER THE ID CODE OF THE PERSON DESIRED: [redacted]

An appropriate modification to this screen, if supported in the application program, would be the ability to select a record by highlighting the record desired and pressing the return key. This process would eliminate the possibility of keying errors being introduced by the user.

If the user is requested to enter information on a TDA position, the screen shown below is presented to the user.

WHAT POSITION WILL THIS PERSON OCCUPY
OR ENTER A ZERO (0) TO QUIT

TDA Paragraph Number [redacted]

TDA Line Number [redacted]

TDA Position Number [redacted]

Another feature that would enhance this input would be the addition of the ability to call up all TDA positions that are unoccupied. The user would then be allowed to select a TDA position by highlighting a particular position from among those depicted on the screen. This enhancement will make the following two screens unnecessary.

The system then verifies the requested TDA position with the TDA database and if the position is found to exist in the database, the user is presented with the following standard TDA position screen.

POSITION CHOSEN:

Job Title : [redacted]

Authorized Branch : [redacted] Authorized Grade : [redacted]

Authorized MOS : [redacted] Authorized Position : *YES*

This screen also converts the authorized position field from its coded value to the correct YES or NO answer depending on the contents of this field.

In the cases where a TDA position is requested and is found to already be occupied by someone else, the warning screen shown below is presented to the user.

THE POSITION IS ALREADY OCCUPIED BY:

Last Name : [redacted]

First Name : [redacted]

Rank : [redacted]

The user is then given the following choices.

YOU NOW HAVE THE FOLLOWING CHOICES:

1. MOVE THE PERSON FOUND IN THE POSITION TO EXCESS (POSITION CODE 99) AND THE PERSON YOU ARE WORKING WITH INTO THE POSITION YOU ORIGINALLY REQUESTED.

2. PLACE THE PERSON YOU ARE WORKING WITH INTO THIS POSITION AS EXCESS (OVERSTRENGTH, POSITION CODE 99).

3. TRY ANOTHER POSITION.

ENTER YOUR CHOICE (1-3) : [redacted]

(2) Enter, change, or remove personnel from the personnel database. As discussed earlier, the user is first requested to enter the identification code of the individual to add, change, or remove from the personnel file. In all of these cases, the system first checks the personnel file for the requested identification code. If the code is already in use, and the user is trying to enter this identification code to add a new person to the personnel file, the standard confirmation screen is displayed with the message "ID CODE REQUESTED IS ALREADY USED BY THE PERSON SHOWN ABOVE" and the user is prompted to try a different code. When the user is updating or removing someone already in the personnel file, this PIC check serves to confirm the identification code already exists in the file and warns the user if it is not found.

If the identification code is not found, the system gives the user the same options as described in the general input screens discussed earlier.

```
                              UPDATE PERSONNEL

ID CODE is W1456
+-------------------------+-------------------+-------+-------+-------+
| Last Name               | First Name  MI    | RANK  | BRANCH | MOS  |
| ######################  | ################  | ####  | ###    | ####  |
+-------------------------+-------------------+-------+-------+-------+
| Arrival Date......##/##/##        Anticipated Date of Loss...##/##/## |
+-------------------------------------------------------------------+

                    INDIVIDUAL IS ASSIGNED TO TDA POSITION
                    +-------------------------------------+
                    |   TDA Paragraph Number is 250       |
                    |   TDA Line Number is 10             |
                    |   TDA Position Number is 99         |
                    +-------------------------------------+
NOTE: If Position Number is 99, the Individual is carried as excess
```

Figure 48. Personnel Input Screen Format

If the user is adding or changing information in the personnel database, the system requests the new position before displaying a blank data entry screen format. This action allows the system to verify that the TDA position is valid and is not already occupied by someone else. If the position is occupied, the standard choice screen as discussed earlier is displayed and the user must choose an appropriate course of action. Once they have selected a course of action, the system then allows access to the personnel database. The screen depicted in Figure 48 is the standard input screen for personnel information. This screen does not allow the user to either change the identification code or the position information, thus preventing the user from circumventing the integrity checks already accomplished by the system.

Once the user has entered information into the personnel file, he or she is given the choice to enter data into the personal file. This data entry format

is displayed in Figure 49. This screen includes the privacy act statement to remind the user of the sensitive nature of this information.

```
This is the personal information for ID CODE S7395

                    PRIVACY ACT STATEMENT
PRINCIPLE PURPOSE: To maintain personal information on individuals assigned to
   this command to facilitate counseling, emergency notification, and social
   event information.

WARNING: This information is of a highly sensitive nature and should not be
   provided to anyone outside of the chain of command without approval.

Address                                  Telephone  (   )    -
City, State, Zip Code                    ,                -
                Date of Rank             /    /
Wife's Name                              Children's Names/Ages
        Comments
```

Figure 49. Personal Information Data Entry Screen

If the user desires to delete someone from the personnel database, the identification code entered by the user is used to find the right record. The screen depicted in Figure 48 is displayed with the message, "IS THIS THE PERSON YOU WANT TO DELETE? (Y/N)" ", included on the screen. This allows the user to confirm the information about the person they desire to delete. If the user deletes the person, the system then purges all the files in the personnel system which have the requested identification code. Several databases are affected: the personnel database; the personal database; the CME request database; and the absence database.

(3) Enter, change, or remove TDA information. The user gains access to the TDA database by initially entering the position they desire to add, change or remove in the position entry format described earlier. In the case where the user is adding a new position, this information allows the system to verify that the TDA position requested does not already exist in the database. If the user is modifying an

already existing TDA record, this information is used to locate the record or warn the user that the position entered does not exist in the database.

```
                    TABLE OF DISTRIBUTION AND ALLOWANCES

        TDA Listing
 Paragraph Number 258                          POSITION TITLE
 Line Number        10                         Job Title
 Position Number    01

                    POSITION CHARACTERISTICS
                 APC Code
                 Authorized Branch
                 Authorized Grade
                 Authorized MOS
                 Position Authorized
                      1=YES  0=NO
```

Figure 50. Table of Distribution and Allowances Input Screen

The system must determine the authorized status of the position. If the position is new to the database, the user is required to answer the prompt, "IS THIS AN AUTHORIZED POSITION? (Y/N) ". If the user answers yes, the system automatically replaces the authorization code with a one, otherwise the code is replaced with a zero. If the user is modifying an already existing database, the system uses the existing code to ask the user if they desire to change the current authorized status to the opposite status. For instance, if the authorized code is zero (0) (unauthorized), the message, "DO YOU WANT TO CHANGE THIS POSITION TO AN AUTHORIZED STATUS? (Y/N) ", is displayed.

If the user desires to delete a position, the format depicted in Figure 50 is used, but it includes a message to verify if the user desires to delete the displayed record. If the record is deleted, the system also checks the personnel database

to determine if someone occupies the deleted position. If a matching position is found in the personnel database, the person's TDA position information is blanked in their record, and the following message is displayed.

> FOUND *CPT SMITH* OCCUPYING THE DELETED POSITION!
> ID CODE IS *S2345* . BE SURE YOU UPDATE THIS PERSON'S
> TDA POSITION WITH A VALID TDA POSITION.

(4) Update from Resource Information Report. This menu choice provides the user with the capability to directly update the personnel database with information provided in the Resource Information Report personnel sections. Figure 51 depicts this input screen. The system also verifies the new position entered to ensure that it is not already occupied, and if it is occupied, responds with the screen of choices discussed earlier.

UPDATE FROM R.I.R. REPORT

B. CHANGES TO CURRENT TDA (OTHER THAN LOSSES OR GAINS)

OLD POSITION						NEW POSITION		
PARA	LINE	POSN	IDCODE	LAST NAME	RANK	PARA	LINE	POSN

PRESS ESCAPE [ESC] TO QUIT

Figure 51. Update from RIR Report screen.

When the user is updating from the personnel losses section on the RIR, the user must first enter the PIC. This code is verified in the manner discussed earlier. The system then prompts the user with, "HAS THIS PERSON ACTUALLY DEPARTED OR IS THIS AN UPDATE TO A PROJECTED LOSS DATE? (ACTUAL=0, PROJECTED=1) ." If the change is a modification of the

anticipated loss date, the user enters the new loss date, and the record is updated automatically. If the loss is an actual PCS from the department, the system invokes the same procedures as described for the deletion of personnel in Section (2) earlier.

(5) Enter, change, or remove CME requests. Figure 52 depicts the standard input screen for the CME request. This screen is designed to match the format of the actual printed CME request form used. The bottom of the screen is used to depict whether the costs displayed are actual expended costs or estimated costs. If the user desires to change an already existing record, the user must first enter the fiscal year of the request and the PIC code of the person sought. As discussed earlier, the confirmation screen displays the personnel information about the selected PIC with the message, "IS THIS THE PERSON YOU EXPECTED? (Y/N) ▮." The system then displays all matching records in the following format:

RECORD NO.	ID CODE	TYPE	START DATE	END DATE
5	S7777	C	06/07/89	07/07/89
15	S7777	G	07/20/89	07/22/89

ENTER THE RECORD NUMBER DESIRED : ▮

The user is then prompted with, "WILL COSTS BE ACTUAL COSTS OR ESTIMATED COSTS? (ENTER AN A FOR ACTUAL OR AN E FOR ESTIMATED):▮." The system takes the user's response and enters the correct cost code into the record. The system will also total all travel costs and update the total cost of travel field in the record.

In the case where the user only wants to update a record with the actual costs and selects this option in the menu, the system displays the same screen in Figure 52, except the user can only input the cost portions of the screen format. The

system then changes the cost code and totals the costs for the user prior to updating the record.

```
SUBJECT: APPLICATION FOR CONFERENCE/MISSION TRAVEL IN FISCAL YEAR 89

1. Type of Travel Requested..... [redacted]
   C-Conference/Meeting Travel  G-General Mission Travel B-Board Certification

2. ID CODE of person requesting the travel is S7396 .

4. Purpose of Travel is [redacted] .   5. Registration Fee  $[redacted].[redacted]

6. Destination [redacted]                Mode of Travel is [redacted]
                                         F-FLY, G-GOVT VEH, P-POV, O-OTHER

8. Leave Dates   Starting Date [redacted]/[redacted]/[redacted]  Ending Date [redacted]/[redacted]/[redacted]
   Duration      0  days

13.  TRAVEL COST $[redacted].[redacted]    PER DIEM COST $[redacted].[redacted]    REIMBURSABLES $[redacted].[redacted]

                 TOTAL COST OF TRAVEL $      0.00

          EXPENSES REFLECT THE ESTIMATED COST OF TRAVEL
```

Figure 52. Continuing Medical Education Request Data Entry Screen

Figure 53 depicts the input screen used to add, change or remove the records in the CME allocation database. There is only one CME allocation for the department for each fiscal year. Therefore, the user is always required to enter the fiscal year prior to using this screen to enter the CME funds allocation.

```
UPDATE CME ALLOCATION

THE CME ALLOCATION FOR FISCAL YEAR 89 SHOULD BE $ [redacted].[redacted]
```

Figure 53. CME Allocation Data Entry Screen.

(6) Enter, change, or remove leave/absence requests. Figure 54 depicts the data entry screen for the absence database. Prior to using this screen, the user must first provide the fiscal year of the request and PIC of the person who will be entered. Once the PIC is entered, it is verified against the personnel database and if it is found,

the standard confirmation screen is displayed with the message, "IS THIS THE PERSON YOU EXPECTED? (Y/N)".

```
                    UPDATE LEAVE OR ABSENCE REQUEST

 This is the Fiscal Year 89 Leave or Absence request for ID CODE S7396

                    Type of Request

 L..Regular Leave     E..Emergency Leave       T..Other TDY, not CME
 P..Permissive TDY    C..Convalescent Leave    O..Other

        Starting Date   /  /      Ending Date   /  /

                    Duration   0 days

        COMMENT
```

Figure 54. Leave and Absence Data Entry Screen

If the user is changing an already existing record, the system uses the PIC entered to display the following:

RECORD NO.	ID CODE	TYPE	START DATE	END DATE
5	S7777	C	06/07/89	07/07/89
15	S7777	G	07/20/89	07/22/89

ENTER THE RECORD NUMBER DESIRED :

Since the PIC has already been verified with the confirmation screen, only the PIC number is displayed. The user can then choose the record desired. As discussed earlier, the ability to "point and shoot" to a particular record would enhance the user's ability to request a particular record. The record is redisplayed in the same entry format depicted in Figure 54.

With each addition or change of a record, the system automatically recomputes the duration field by subtracting the starting date from the ending date. This

constant updating insures that this field will always be updated prior to saving the database.

c. Outputs

(1) Review Screens. The review of the personnel, TDA, absence, and CME request databases are accomplished by the use of the standard review screen. Each review option provides the user with the generic review display described in Section B of this chapter. The data fields presented, with the exception of the CME request database and the absence database, are simply the fields existing in the database. The CME request database and absence database are combined with the personnel database to create a new temporary database that contains the name associated with each PIC in the databases. The additional review fields displayed with the already existing fields in the CME request or absence database are the Rank, First Name, and Last name of the person that matches the PIC field in the CME or absence databases.

(2) Position Listing (see Figure 55). This report provides the Chief with a listing of all TDA positions within his department and the personnel assigned to those positions. This report is generated by combining the TDA database with the personnel database where the TDA position in the personnel database matches the TDA position in the TDA database. If no match is found, the TDA information is printed but with the personnel information left blank. If the person is carried as excess, their information is also printed but with only the TDA paragraph number, TDA line number, and the excess position code of 99. This report is sorted in TDA paragraph number, line number, and position number order whether the position is filled or not.

DEPARTMENT OF FAMILY PRACTICE & COMMUNITY MEDICINE (TDA)

11 MAR 88

PARA	LINE	POSN	GR	MOS	BR	JOB TITLE	RANK/NAME	AUTH	STATUS
DEPARTMENT OF FAMILY PRACTICE (DEP)									
531	01	01	06	61H00	MC	C, DEPT FP	LTC ##########	Y	
531	02	01	EL	91B50	EL	CLINIC NCO	MSG ##########	Y	
531	02	99					MSG ##########		
531	03	01	05	00318	GS	SECT (T/S)	MS. ##########	Y	
PARAGRAPH TOTAL ***				AUTHORIZED :03			ASSIGNED : 04		
FAMILY PRACTICE CLINIC (FPC)									
532	01	01	05	61H00	MC	FAM PHYS	LTC ##########	Y	
532	02	01	04	61H00	MC	FAM PHYS	MAJ ##########	Y	
532	02	02	04	61H00	MC	FAM PHYS	LTC ##########	Y	
532	02A	01	03	61H00	MC	FAM PHYS	CPT ##########	Y	
532	02A	02	03	61H00	MC	FAM PHYS	MAJ ##########	Y	
532	02A	03	03	61H00	MC	FAM PHYS	LTC ##########	Y	
532	02A	99	03				MAJ ##########		
532	03	01	03	61H00	MC	FAM PHYS	CPT ##########	Y	1
532	03	02	03	61H00	MC	FAM PHYS	CPT ##########	Y	1
532	03	03	03	61H00	MC	FAM PHYS	CPT ##########	Y	1
532	03	04	03	61H00	MC	FAM PHYS	CPT ##########	Y	1
532	03	05	03	61H00	MC	FAM PHYS	CPT ##########	Y	1
532	03	06	03	61H00	MC	FAM PHYS	CPT ##########	Y	1
532	03	07	03	61H00	MC	FAM PHYS	COL ##########	Y	2
532	03	08	03	61H00	MC	FAM PHYS	CPT ##########	Y	2
532	03	09	03	61H00	MC	FAM PHYS	CPT ##########		2
532	03	10	03	61H00	MC	FAM PHYS	CPT ##########		2
532	03	11	03	61H00	MC	FAM PHYS	CPT ##########		2
532	03	12	03	61H00	MC	FAM PHYS	CPT ##########		2
532	03	13	03	61H00	MC	FAM PHYS	"VACANT"		
532	03	14	03	61H00	MC	FAM PHYS	"VACANT"		
532	04	01	04	66H00	AN	HEAD NURSE	CPT ##########	Y	
532	05	01	03	66H00	AN	MED SURG NUR	ILT ##########	Y	
532	05A	01	E6	71L30	EL	ADMIN SUPV	MSG ##########	Y	
532	06	01	E6	91B30	EL	CLINIC NCO	MSG ##########	Y	
532	07	01	E5	91B20	EL	MED SP	SPC ##########	Y	
532	08	01	E5	91A20	EL	MED SP	SPC ##########	Y	
532	09	01	E4	91A10	EL	MED SP	SPC ##########	Y	
532	09	02	E4	91A10	EL	MED SP	SPC ##########	Y	
532	10	01	E3	91A10	EL	MED SP	PFC ##########	Y	
532	10	02	E3	91A10	EL	MED SP	PFC ##########	Y	
532	10	99				EXCESS	PFC ##########	Y	
532	12	01	03	00679	GS	MED CLK (T)	MS. ##########	Y	
532	12	02	03	00679	GS	MED CLK (T)	"VACANT"	Y	
532	12	03	03	00679	GS	MED CLK (T)	MS. ##########	Y	
532	88	01	03	61H9D	MC	FAM PHYS	CPT ##########	Y	3
532	88	02	03	61H9D	MC	FAM PHYS	CPT ##########	Y	3
532	88	03	03	61H9D	MC	FAM PHYS	CPT ##########	Y	3
532	88	04	03	61H9D	MC	FAM PHYS	CPT ##########	Y	3
532	88	05	03	61H9D	MC	FAM PHYS	CPT ##########	Y	3
532	88	06	03	61H9D	MC	FAM PHYS	CPT ##########	Y	3
532	88	07	03	61H9D	MC	FAM PHYS	CPT ##########	Y	3
532	88	08	03	61H9D	MC	FAM PHYS	CPT ##########	Y	3
PARAGRAPH TOTAL ***				AUTHORIZED : 26			ASSIGNED : 37		

* INDICATES A 60 DAY ANTICIPATED LOSS

(1) - 3rd YEAR RESIDENCY (2) - 2nd YEAR RESIDENCY (3) - 1ST YEAR RESIDENCY (STUDENT)

Figure 55. Position Listing Report

The fields necessary to create this report are:

- Section Description for each TDA Paragraph Number.
- TDA Paragraph Number.
- TDA Line Number.

- TDA Position Number.
- Authorized Grade for above TDA position.
- Authorized MOS for the above TDA position.
- Authorized Branch for the above TDA position.
- TDA Official Job Title.
- Rank.
- Last Name.
- Authorization Code for the position.
- Doctor Status Code. This code reflects the current residency status of a doctor in the residency program.
- Anticipated date of PCS for the person in the position.

The following numbered items correspond with the numbers in Figure 55.

1 This section title correlates to the TDA paragraph number in the TDA.

2 This subtotal is the total authorized positions within the TDA Paragraph number. This is calculated by totaling the authorized position fields for each paragraph number.

3 This is the number of persons assigned to a particular TDA paragraph. This number is calculated by counting the number of TDA positions where the name field is not blank within the same TDA paragraph number.

4 If no name is associated with a TDA position, the phrase "VACANT" is printed in this field.

5 The doctor status codes in the database. They are also explained in a footnote at the bottom of the report.

6 The RANK, FIRST NAME and LAST NAME of the person who occupies a TDA position are concatenated to produce this field.

7 This total is the total for the department and is a total of all the TDA paragraphs subtotals.

8 Personnel whose position code is designated as 99 do not have a job title since they are carried in an excess capacity.

9 This "•" flag indicates that the person listed has an anticipated loss date that is less than 60 days from the current system date.

(3) Section Update Worksheet (see Figure 56). This worksheet allows the department to update its personnel database with new position information, changes or additions to the anticipated loss date field, and changes to the personnel status field. This report is very similar to the position listing with the exception of the following:

- Each paragraph within the TDA is printed separately to facilitate individual delivery to sections.
- There are three fill in the blank fields added to allow the section to directly annotate changes into the worksheet.

This report is created from the same combination of databases necessary for the personnel listing, but only the following fields are needed to print this worksheet:

- Section Description for each TDA Paragraph Number.
- TDA Paragraph Number.
- TDA Line Number.
- TDA Position Number.
- TDA Official Job Title.
- Rank.
- Last Name.

- Doctor Status Code for the person who occupies the TDA position. (Only applies to doctors in the residency program).

- Anticipated date of PCS for the person in the position.

SECTION WORKSHEET
DEPARTMENT OF FAMILY PRACTICE & COMMUNITY MEDICINE
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PARA	LINE	POSN	JOB TITLE	RANK/NAME	STATUS	ALOSS	NAME	STATUS	ALOSS
FAMILY PRACTICE CLINIC (FPC)									
532	01	01	FAM PHYS	LTC **********		07/20/79			
532	02	01	FAM PHYS	MAJ **********		99/99/99			
532	02	02	FAM PHYS	LTC **********		99/99/99			
532	02A	01	FAM PHYS	CPT **********		99/99/99			
532	02A	02	FAM PHYS	MAJ **********		07/20/79			
532	02A	03	FAM PHYS	LTC **********					
532	02A	99		MAJ **********					
532	03	01	FAM PHYS	CPT **********	1				
532	03	02	FAM PHYS	CPT **********	1				
532	03	03	FAM PHYS	CPT **********	1				
532	03	04	FAM PHYS	CPT **********	1				
532	03	05	FAM PHYS	CPT **********	1	06/10/90			
532	03	06	FAM PHYS	CPT **********	1				
532	03	07	FAM PHYS	COL **********	2				
532	03	08	FAM PHYS	CPT **********	2				
532	03	09	FAM PHYS	CPT **********	2				
532	03	10	FAM PHYS	CPT **********	2				
532	03	11	FAM PHYS	CPT **********	2				
532	03	12	FAM PHYS	CPT **********	2				
532	03	13	FAM PHYS	"VACANT"					
532	03	14	FAM PHYS	"VACANT"					
532	04	01	HEAD NURSE	CPT **********					
532	05	01	MED SURG NUR	ILT **********					
532	05A	01	ADMIN SUPV	MSG **********					
532	06	01	CLINIC NCO	MSG **********					
532	07	01	MED SP	SPC **********					
532	08	01	MED SP	SPC **********					
532	09	01	MED SP	SPC **********		06/29/91			
532	09	02	MED SP	SPC **********					
532	10	01	MED SP	PFC **********					
532	10	02	MED SP	PFC **********					
532	10	99		PFC **********					
532	12	01	MED CLK (T)	MS. **********					
532	12	02	MED CLK (T)	"VACANT"					
532	12	03	MED CLK (T)	MS. **********					
532	88	01	FAM PHYS	CPT **********	3				
532	88	02	FAM PHYS	CPT **********	3				
532	88	03	FAM PHYS	CPT **********	3				
532	88	04	FAM PHYS	CPT **********	3				
532	88	05	FAM PHYS	CPT **********	3				
532	88	06	FAM PHYS	CPT **********	3				
532	88	07	FAM PHYS	CPT **********	3				
532	88	08	FAM PHYS	CPT **********	3				
PARAGRAPH TOTAL *** AUTHORIZED : 26 ASSIGNED : 37									

(1) - 3rd YEAR RESIDENCY (2) - 2nd YEAR RESIDENCY (3) - 1ST YEAR RESIDENCY (STUDENT)

Figure 56. Section Update Worksheet

The following numbered items correspond with Figure 56.

1 These fields are intentionally left blank to allow the section to input changes to the current TDA position listing.

2 The RANK and LAST NAME of the person who occupies a TDA position are concatenated to produce this field.

(4) Loss Report (see Figure 57). This report provides the department with a listing of all personnel who have an anticipated PCS date between two user specified dates. Prior to printing this report, the user is required to enter these dates to define the parameters for which this report will be printed.

LOSS REPORT
DEPARTMENT OF FAMILY PRACTICE & COMMUNITY MEDICINE
11 MAR 89

(1)

START DATE : 06/01/89 **ENDING DATE : 09/25/89**

The following personnel have expected anticipated loss dates within the above dates:

RANK	NAME	SECTION	PCS DATE
CPT	JOHN SMITH	AMB	07/01/89
CPT	JANE DOE	CTM	09/01/89
MSG	GERY JONES	CTM	07/09/89
1LT	WAYNE SHARPE	FPC	07/20/89

(2)

Figure 57. Loss Report

This following fields are necessary to print this report.

- Rank.
- Last Name.
- Section Description for the person.
- Anticipated Date of Loss.

The following numbered items correspond with Figure 57.

1 The date parameters for the report entered by the user.

2 The date in this field must lie between the parameter dates established by the user.

(5) Vacancy Listing (see Figure 58). This report provides a listing of all TDA positions within the department that are vacant. This report provides the Chief with a quick look at his personnel shortages and the current vacant positions within the department.

VACANCY REPORT
DEPARTMENT OF FAMILY PRACTICE & COMMUNITY MEDICINE
11 MAR 89

The following TDA Positions are vacant:

PARA	LINE	POSN	GR	MOS	BR	JOB TITLE	AUTH
FAMILY PRACTICE CLINIC (FPC)							
532	03	13	03	61H00	MC	FAM PHYS	NO
532	03	14	03	61H00	MC	FAM PHYS	NO
532	12	02	03	00679	GS	MED CLK (T)	YES

PARAGRAPH SUBTOTAL *** VACANCIES : 3 ← (1)

EMERGENCY MEDICAL SERVICE (EMS)							
581	17	01	13	00602	GS	GEN MED OFF	YES
581	17	02	13	00602	GS	GEN MED OFF	YES

PARAGRAPH SUBTOTAL *** VACANCIES : 2 ← (3)

TOTAL DEPARTMENT VACANCIES : 5

Figure 58. Vacancy Listing

This report file is generated in the same manner as the position listing except that only the TDA positions which do not have a matching person assigned to a position are printed.

The following numbered items correspond with Figure 58.

1 This is a count of all authorized positions that are vacant within a given TDA paragraph number. This total represents the sum of the authorized field for the TDA paragraph.

2 If the position is authorized (code=1), "YES" is displayed, otherwise "NO" is displayed.

3 Total Department Vacancies. This total is the sum of all TDA paragraph subtotals mentioned in Note 1 above.

(6) Social Roster (see Figure 59). This roster provides personnel within the department a roster of personal information of assigned personnel within the department. This roster both serves as a social listing to facilitate social gatherings and as an emergency notification listing for department personnel. The creation of this report requires the combination of the personnel database and personal database. In the case where there is not a match to a personnel record in the personnel database, "NO PERSONAL DATA" is printed in the report.

The fields necessary to create this report are:

- Last Name.
- First Name and Middle Initial.
- Rank.
- Branch of Service.
- Military Occupational Specialty Code.
- Arrival Date within the Department.
- TDA Official Job Title.
- Section Description for each TDA Paragraph Number.
- Local Home address.
- City of Home address.
- State.
- Spouse's first name.

- Children's names, followed by their ages (if appropriate).
- Home telephone number.
- Date of rank.

SOCIAL ROSTER
DEPARTMENT OF FAMILY PRACTICE & COMMUNITY MEDICINE
11 MAR 89

PRIVACY ACT STATEMENT

DEPARTMENT OF FAMILY PRACTICE (DEP)

LTC SMITH, JOHN R. POSN: C, DEPT FP
BR: MC MOS: 61H00 ARR: 07/20/87

1200 BIRDTREE LANE
ANYWHERE STATE 99999-9999
PHONE: (408)999-9999
WIFE: BECKY CHILDREN: JIM/10, MIKE/4, SUE/1

FAMILY PRACTICE CLINIC (FPC)

LTC JONES, SUE R. POSN: FAM PHYS
BR: MC MOS: 61H00 ARR: 07/20/88

1200 SINGASONG ROAD
ANOTHERPLACE STATE 99999-9999
PHONE: (408)888-8888
WIFE: N/A CHILDREN: BECKY JOE/1

MAJ BURB, HERB R. POSN: FAM PHYS
BR: MC MOS: 61H00 ARR: 06/11/85

23 CHIRPING TREE LANE
ANYWHEREELSE STATE 99999-9999
PHONE: (408)444-4444
WIFE: JO CHILDREN:

Figure 59. Social Roster

This report is created in the format shown in Figure 59. Entries are sorted by TDA paragraph number and then by rank within the position paragraph number.

(7) Monthly Absence Report (see Figure 60). This report provides the department with a listing of personnel who have planned absences, either a planned CME course or a regular absences (i.e., leave), within an selected month. This report is used by the department managers and the clinical director (see scheduling information system) to manage personnel assets on a month to month basis. The user is required to enter the month and the fiscal year desired prior to output of this report. This report is generated by combining the absence database and the CME request database and then combining this new database with the personnel database to get the rank and name of the person who plans to be absent in the selected month. The report file is then sorted by section and last name prior to printing.

MONTHLY ABSENCE REPORT
DEPARTMENT OF FAMILY PRACTICE & COMMUNITY MEDICINE
11 MAR 89

MONTH : JULY (1) FISCAL YEAR : 89

The following personnel have planned absences during the month of July:

RANK	NAME (4)	SECTION	START DATE	END DATE	TYPE
CPT	JOHN SMITH	AMB	07/01/89	07/15/89	CME
CPT	JANE DOE	CTM	06/01/89	07/02/89	EMER LV
MSG	GERY JONES	CTM	07/09/89	08/25/89	LEAVE
1LT	WAYNE SHARPE	FPC	07/20/89	07/22/89	PERM TDY
SGT	WAYNE ROGERS	POM	07/30/89	08/30/89	ORD TDY

(2) (3)

Figure 60. Monthly Absence Report.

The fields required to produce this report are:

- Rank of the person who has an absence planned during the requested month.
- Last Name.
- First Name.
- Section of assignment.
- Start date of planned absence.
- End Date of planned absence.
- Type of Absence.

The following numbered items correspond with Figure 60.

1 The fiscal year and month desired are entered by the user prior to output of report. If the record in the combined database falls within the requested start date or end date, the absence record is included within the report. If the record is inclusive of the requested start and end date, e.g., a request in July falls between a user specified start date in June and an end date August, the record will be included in the report.

2 Section codes are sorted to keep personnel along organizational lines. The secondary sort is on the last name.

3 Type request code is converted to its full text format. Care must be taken not to assign the same type code to both the CME database and the absence database.

4 The RANK, FIRST NAME, and LAST NAME fields are concatenated to give the appearance that the field is one field.

(8) Fiscal Year Summary of Physician Absences (see Figure 61). This summary report provides the Department Chief with the ability to monitor and evaluate the number of and frequency of doctor absences within the department. This report serves as an indicator of doctor availability over the fiscal year and shows the frequency of absences by type of request. This report is generated in the same manner as described in the absence report except this report is not restricted to one month and

extracts only doctor information. The user is only required to enter the fiscal year desired. The fields necessary to generate this report are the same as the absence report but also include the duration field from both of the databases.

FISCAL YEAR ABSENCE SUMMARY
DEPARTMENT OF FAMILY PRACTICE &
COMMUNITY MEDICINE
11 MAR 89

FISCAL YEAR : 89

NAME		START DATE	END DATE	DURATION
LTC JOHN SMUCK				
	TYPE :	*CME REQUEST*		
		01/01/89	01/30/89	29
		06/05/89	06/10/89	5
		Subtotal.....		34
	TYPE :	*ORDINARY LEAVE*		
		03/05/89	03/30/89	25
		06/10/89	06/20/89	10
		Subtotal.....		35
		Total.....		69 days
LTC JANE SMITH				
	TYPE :	*CME REQUEST*		
		03/01/89	03/30/89	29
		04/01/89	04/19/89	18
		05/05/89	05/15/89	10
		Subtotal.....		57
	TYPE :	*PERMISSIVE TDY*		
		09/25/89	09/30/89	5
		Subtotal.....		5
	TYPE :	*ORDINARY LEAVE*		
		02/01/89	02/28/89	27
		Subtotal.....		27
		Total.....		89 days

Figure 61. Fiscal Year Summary of Physician Absences.

The following numbered items correspond with Figure 61.

1 Each person identified as having at least one absence during the fiscal year is reported in last name order.

2 Under each person, all absences are sorted by request type in alphabetical order with breaks between different types of absences.

3 Duration is extracted directly from the databases reflecting the End Date minus the Start Date in days.

4 Subtotal of the duration for each type of absence, for each person.

5 Total duration for all absences for the given person.

(9) CME Reports (Actual and Estimated) (see Figures 62 and 63). These reports allow the Department Chief to monitor the CME expenditures and estimate the funds remaining for a given fiscal year. The CME reports are critical in keeping track of the limited funds available to send doctors to the training necessary to keep them certified in critical medical skills.

These two reports are very similar but are used in separate contexts. The Actual CME Budget Expenditure Report is used to report the amount actually spent during a given fiscal year, excluding all estimated costs figures. This report gives the Department Chief an accurate look at the funds remaining for the requested fiscal year. The Estimated CME Budget Expenditure report not only gives the Chief a look at what funds have actually been spent, but also provides a listing of the approved CME funded travel for which travel claims have not yet been settled. This report is also used at the beginning of the fiscal year to report the projected expenditures for a requested fiscal year.

CONTINUING MEDICAL EDUCATION
ACTUAL FUNDS REPORT

DEPARTMENT OF FAMILY PRACTICE &
COMMUNITY MEDICINE (TDA)

11 DEC 89

NAME	RANK	DATES OF TDY	LOCATION OF TDY	REASON FOR TDY	TRAVEL COST	PER DIEM	REG FEE	REIMB COST	TOTAL COST	UNCOMMITTED FUNDS
									FUNDS ALLOCATED :	16789.92
SMITH, JOHN	CPT	09/09/89-09/20/89	LAS VEGAS, NV	ORTHO	147.00	320.00	395.00	0	862.00	15927.92
JONES, JANE	MAJ	10/10/89-11/20/89	RENO, NV	AOA	169.25	437.50	210.00	50	866.75	15061.17
CME TRAVEL APPROVED BUT NOT COMPLETED (ESTIMATED COSTS)										12500.00
PROJECTED FUNDS REMAINING										2561.17

Figure 62. Actual CME Budget Expenditure Report

CONTINUING MEDICAL EDUCATION
ESTIMATED FUNDS REPORT

DEPARTMENT OF FAMILY PRACTICE &
COMMUNITY MEDICINE (TDA)

11 DEC 89

NAME	RANK	DATES OF TDY	LOCATION OF TDY	REASON FOR TDY	TRAVEL COST	PER DIEM	REG FEE	REIMB COST	TOTAL COST	UNCOMMITTED FUNDS
									FUNDS ALLOCATED :	16789.92
SMITH, JOHN	CPT	01/05/89-01/20/89	LAS VEGAS, NV	ORTHO	147.00	320.00	395.00	0	862.00	15927.92
JONES, JANE	MAJ	05/10/89-05/20/89	RENO, NV	AOA	169.25	437.50	210.00	50	866.75	15061.17
ANDERS, KEN	CPT	07/20/89-08/15/89	SAN DIEGO, CA	EMERG	100.00	400.00	200.00	50	750.00	14311.17
ALL ESTIMATED AND ACTUAL TRAVEL COSTS REPORTED HERE										
PROJECTED FUNDS REMAINING										14311.17

Figure 63. Estimated CME Budget Expenditures Report

The user is required to enter the fiscal year of the report prior to creation of either report. The fields required to create these reports are:

- Last Name of requestor.
- First Name.
- Rank of the requestor.
- Start and End dates of travel.
- Destination.

- Purpose of Request, e.g., ORTHO WORKSHOP.
- All Costs of travel, including the Travel Cost, Per diem costs, registration fee, reimbursable expenses, and total cost fields of the request.
- Cost Code, whether it is an actual accrued cost or an estimated cost of the travel.
- Allocated CME budget for the fiscal year from the CME allocation database.

To create this report requires that the CME request database be combined with the personnel database to match the name of a person with the PIC in the CME request database. The CME allocation database is also used to determine the actual allocation for the selected fiscal year.

The following numbered items correspond with the numbers in Figures 62 and 63.

1 This number is the actual allocation for the current fiscal year selected.

2 This is an accumulated total of the actual costs incurred for the current fiscal year.

3 This number reflects the allocation for the current fiscal year minus the actual expenses already incurred.

4 This figure is the previous allocation minus the total cost of travel for the current record.

4. Scheduling Information System

We concluded in Chapter IV that although automating the scheduling system would be impractical, improvements could be made in the system by standardizing the forms used in data collection and reporting.

Figure 64 is the UCD depicting the proposed scheduling system. Although most of the scheduling process will remain the same, the clinical director will now be

able to get pre-printed standard forms for recording doctor availability information. These forms can be created with commercially available software packages (e.g., FORMTOOL) and maintained on diskettes in the administration office.

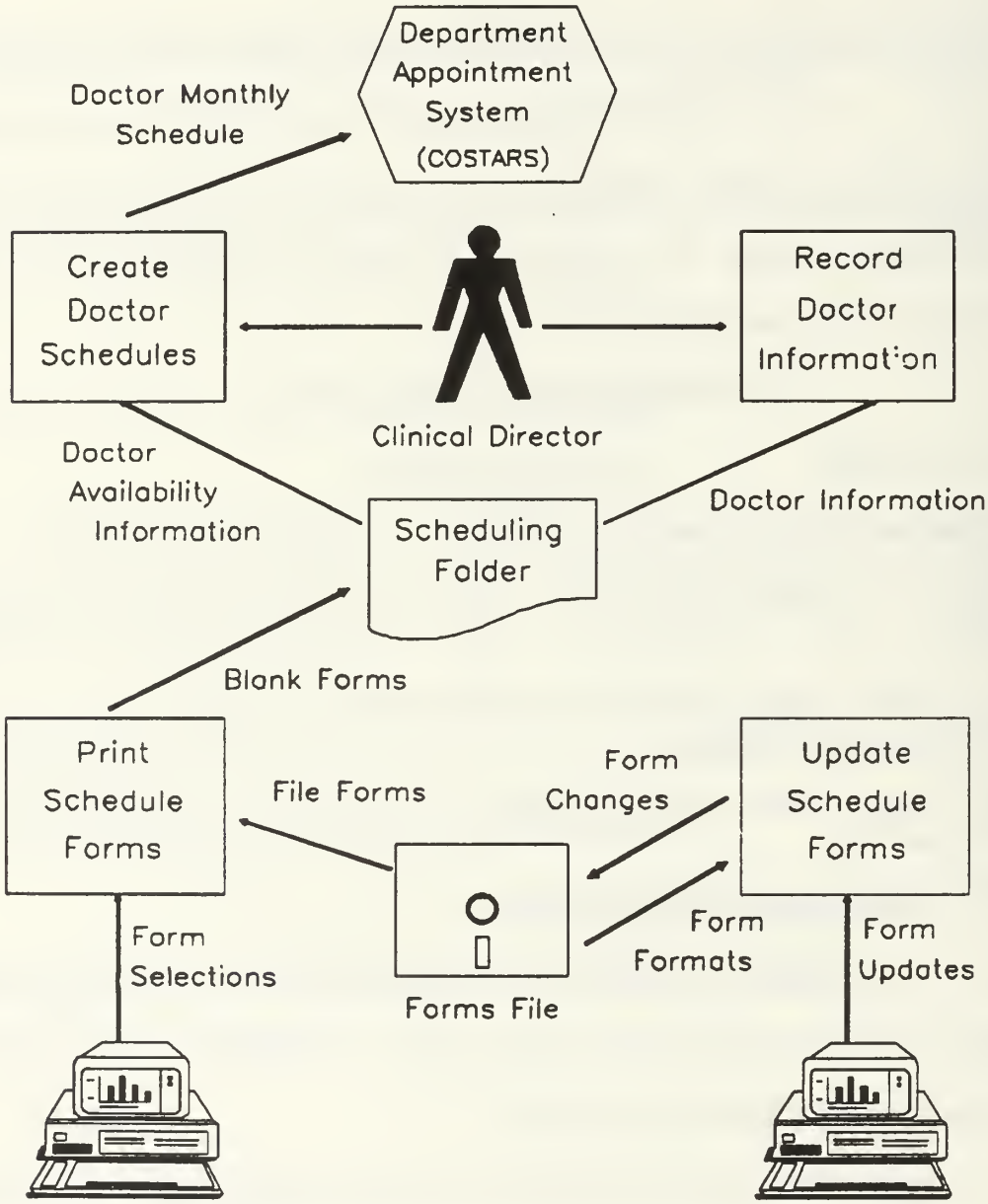


Figure 64. Scheduling User Concept Diagram

After discussions with the clinical director, it was determined that the most valuable forms to standardize are the duty history sheet, the monthly cumulative tally sheet, and the clinic schedule template. Other sources of information such as the 3x5 cards containing staff doctor and resident's special availability instructions were considered to be adequate in their current form. The resulting forms are shown in Figures 65 and 66.

Figure 65 is the Duty History Record which is a combination of the duty history sheet and the monthly cumulative tally sheet. A completed duty history record will provide the scheduler with a comprehensive history of each doctor's on call duty.

Figure 66 is the clinic schedule template. Since this form is a template, the staff doctors permanent schedules are included. The template can be penciled in by the scheduler to show residents' schedules for the month. The resident's names can then be entered into the form using the fill-in-form option of FORMTOOL and a complete schedule can be printed for distribution. The clinical director liked the idea of the template. The template can be changed easily and each month a clean template can be used without having to first delete the resident's names from the previous month's schedule.

Date_____ Duty History Record

Doctor Name	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	/Weekends	/Holidays	Holidays

Figure 65. Duty History Record

Month ____ Yr ____ Schedule Template

TEAMS		MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
Gold Lorenzen Mork Foster Birdsong Landauer Crisp Spinelli Herman Terrio, H	AM		Foster		Lorenzen Foster	
	PM	Mork Foster	Lorenzen Mork	Foster	Mork	Mork Foster
Red Forred Hutnak Lee Schmidt Walcott Bradley Sorensen	AM	Forred	Forred Fuller	Fuller		Forred
	PM	Fuller		Forred	Forred Fuller	Fuller
Blue Kugler Spaulding Yeash Ard Runkle Davis Goodrich Swann Terrio,J Weaver	AM	Spaulding Kugler	Spaulding Yeash	Kugler Yeash	Spaulding Fitzharris Yeash	Spaulding Kugler
	PM	Yeash	Fitzharris Kugler	Spaulding	Kugler	Yeash

Figure 66. Schedule Template

5. Patient Satisfaction Information System (see Program, Appendix F)

a. Data Structures

As can be seen in the UCD in Figure 67, the entire patient satisfaction system hinges on completed patient surveys, the results of which are entered into a survey database for use in report generation.

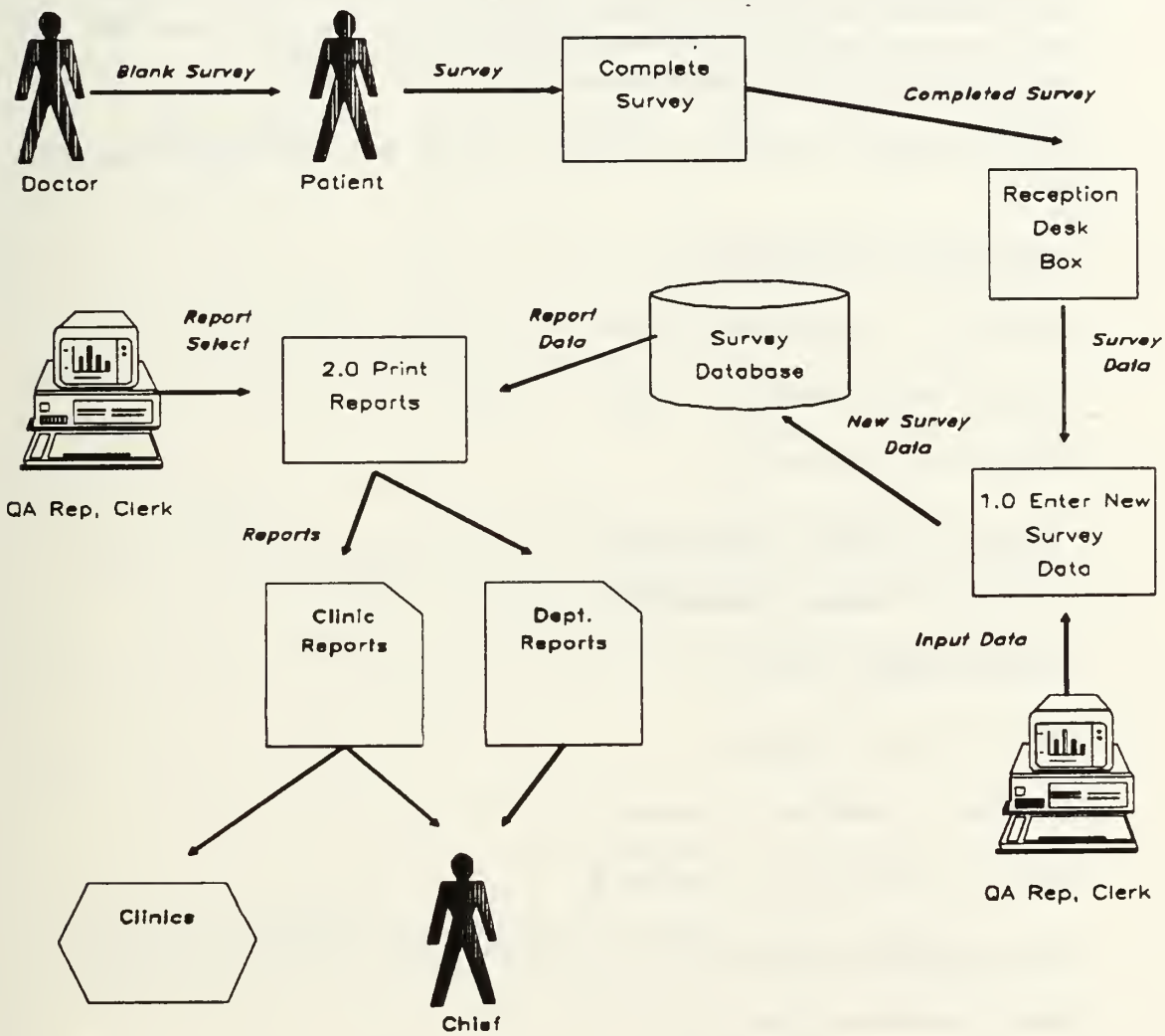


Figure 67. Patient Satisfaction User Concept Diagram

The approved opinion survey, designed in cooperation with the Department Chief and the Quality Assurance (QA) representative, is shown in Figure

68. The questions and answers cover those areas of most concern to the Department Chief. The survey form determines the data structure of the database itself, with data fields corresponding to each question. The following data fields are used in the database to record survey data.

- Month. The month the survey was completed by the patient.
- Year. Calendar year the survey was taken.
- Section Code. Same as systems above.
- Doctor's Name. The name of the doctor seen by the patient completing the survey.
- Appointment Days. Question 1A.
- Appointment Acceptability. Question 1B.
- Records Ready. Question 2.
- Waiting Time. Question 3A.
- Waiting Acceptability. Question 3B.
- Receptionist Courtesy. Question 4.
- Nursing Courtesy. Question 5.
- Doctor Courtesy. Question 6
- Procedures Explanations. Question 7.
- Time Spent With Doctor. Question 8.
- Clinic Cleanliness. Question 9.
- Overall Satisfaction. Question 10.
- Patient Comments to Enter?. The user entering the survey results into the survey database must enter a "Y" in this field to indicate there are comments to be added to the database for this survey. An "N" indicates there are no comments. The following section on Inputs explains this further.

- Comments. A memo field which the user can fill from comments made on the patient surveys.

Department of Family Practice
Patient Opinion Survey

Your opinion is important to us. Please complete this survey and return it to the box located at the reception desk.

Sincerely,

Chief, Department of Family Practice

Month ____ Year ____ Clinic _____ Doctor _____

PLEASE CIRCLE THE ANSWER TO THE RIGHT OF EACH QUESTION

1.A. How many days did it take to get your appointment?	1) Same Day 2) Less than 7 3) Less than 14 4) Less than 30 5) More than 30
B. Was this time acceptable?	1) Acceptable 2) Not Acceptable
2. Were your records ready at the front desk?	1) YES 2) NO
3.A. How long did you wait to see the doctor?	1) Less than 15 min 2) Less than 30 min 3) Less than 45 min 4) Less than 1 hour 5) More than 1 hour
B. Was the waiting time acceptable?	1) Acceptable 2) Not Acceptable

PLEASE CIRCLE THE NUMBER TO THE RIGHT OF EACH QUESTION WHICH MOST CLOSELY MATCHES YOUR OPINION BASED ON THE FOLLOWING SCALE:

5=Excellent 4=Good 3=OK 2=Needs Improvement 1=Unsatisfactory

4. Courtesy of receptionists.....	5 4 3 2 1
5. Courtesy of nursing staff.....	5 4 3 2 1
6. Courtesy of doctor.....	5 4 3 2 1
7. Explanation of procedures (lab work, EKG's, etc).....	5 4 3 2 1
8. The amount of time the doctor spent with you.....	5 4 3 2 1
9. The general cleanliness of the clinic.....	5 4 3 2 1
10. Overall satisfaction with the care you received.....	5 4 3 2 1

COMMENTS: _____

THANK YOU !!

Figure 68. Opinion Survey Form

b. Data Inputs

The Patient Opinion menu hierarchy chart is depicted in Figure 69. The user can enter new survey data using the input screen shown in Figure 70. This input screen contains all of the data base fields arranged in a format similar to the actual survey for simplified data entry. The answers to the survey's numbered questions are coded: the user simply enters one number corresponding to the survey answer. Since each question has a predetermined number of responses, error checking is simply a matter of verifying the input number falls in the allowable range. For example, question 1A has five possible answers. If the user entered anything other than one through five, a bell would sound and a message saying the input was out of range would appear at the bottom of the screen. The user is then given the chance to enter the correct answer. At the bottom of the input screen the user is asked if there are comments to be entered. The user enters a "Y" or "N" in the Patient Comments to Enter field. The Patient Comments to Enter field is necessary when printing the patient comments report discussed in Outputs below because a memo field in the database program cannot be used to determine records to print. Therefore, it is necessary to have a second field whose value indicates whether the comment field is filled to allow only those records with comments to be printed.

The use of mark-sense forms would allow automatic entry of the survey data into the database. Unfortunately, neither the department nor the hospital has the computer hardware to read mark-sense forms and there are no plans to acquire such technology. Additionally, we feel the added complexity of mark-sense forms, e.g., special marking requirements and additional instructions, would deter some patients

from completing the surveys. Also, the requirement to purchase specially designed forms may deter the department from obtaining the surveys.

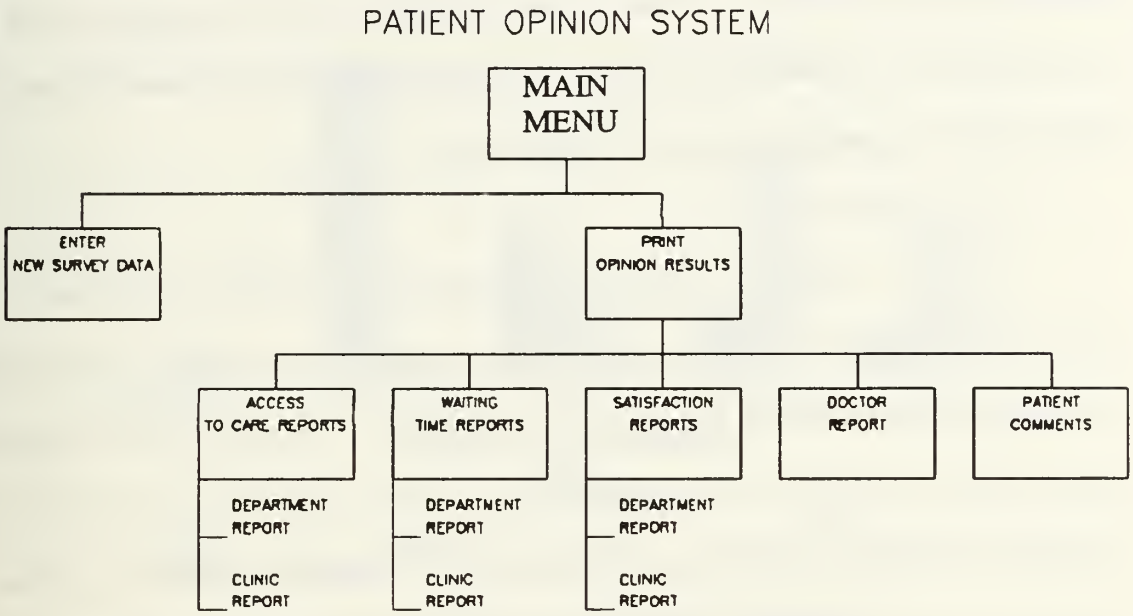


Figure 69. Patient Satisfaction Menu Hierarchy Chart

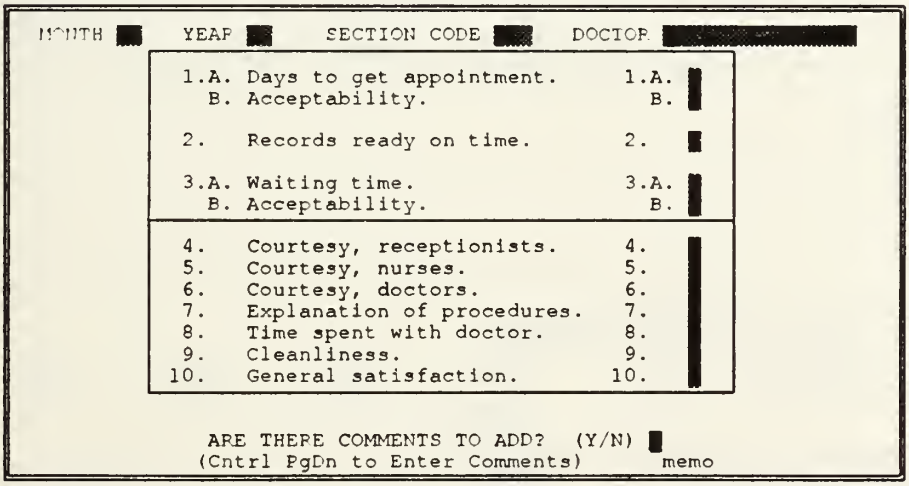


Figure 70. Patient Satisfaction Input Screen

Once the survey data is entered into the database, the user can print one of several reports. After selecting the report desired from the menu, the user is prompted to enter information which further identifies the report parameters such as year, month, and (if necessary) the clinic's section code. This information is used to gather the data necessary to create the desired output.

c. Outputs

(1) Access to Care Reports (see Figure 71). There are two access to care reports, one for the department as a whole, and one for each clinic. Both consist of two parts and are identical in content and appearance. However, for clinic reports, only the survey data for the selected clinic is used. Part One of the report, Acceptability of Appointment Access indicates to the Department Chief the patients' opinions on the acceptability of the length of time it took them to obtain an appointment. Part Two, Average Days to Get Appointment, allows the Department Chief to examine the trend in the average number of days to get an appointment.

The following fields are necessary for creating the two part access to care reports.

- Month.
- Year.
- Section Code. For clinic report only.
- Appointment Days.
- Appointment Acceptability. Required only for Part 1, Acceptability of Appointment Access.

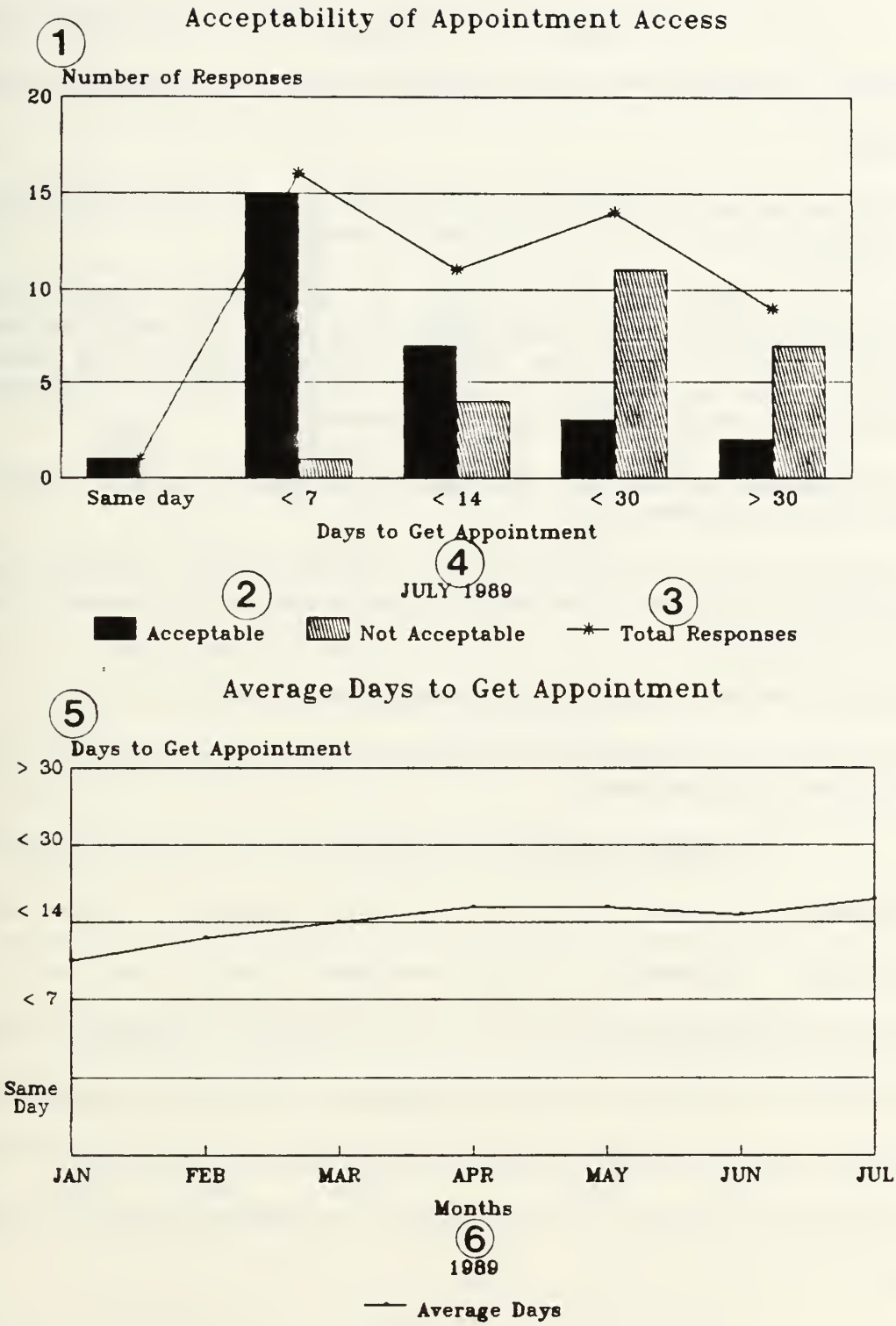


Figure 71. Access to Care Report

The following numbered items correspond to the numbers shown in Figure 71 and explain the data manipulations and calculations required to produce the report.

1 The total number of responses for each possible answer to survey question 1A are graphed along the Y-axis based on note 2 below.

2 For each possible answer to question 1A, the number of patients who responded to question 1B as acceptable and unacceptable are counted and each count is graphed as a separate bar. For example, in the figure, for those patients that said it took them less than seven days to get an appointment, 15 said this was acceptable and one said this was unacceptable.

3 The total response line shows the total responses for each possible answer to question 1A, appointment days.

4 This is the month and year of the survey. This data is input by the user when requesting the report and is used by the program to select the appropriate survey database records.

5 In Part Two, the days to get an appointment are graphed on the Y-axis.

6 The responses to question 1A are averaged for each month of the desired year and plotted along the X-axis.

(2) Waiting Time Reports (see Figure 72). As with the access to care reports, there are two waiting time reports, one for the department as a whole, and one for each clinic. The format of the waiting time report is similar to the access to care report for both department and clinic. Part One of the report, Acceptability of Waiting Time indicates to the Department Chief the patients' opinions of the acceptability of the length of time it took them to be seen by the doctor. Part Two, Average Waiting Time, denotes the trend over the calendar year of the average waiting time to see a doctor.

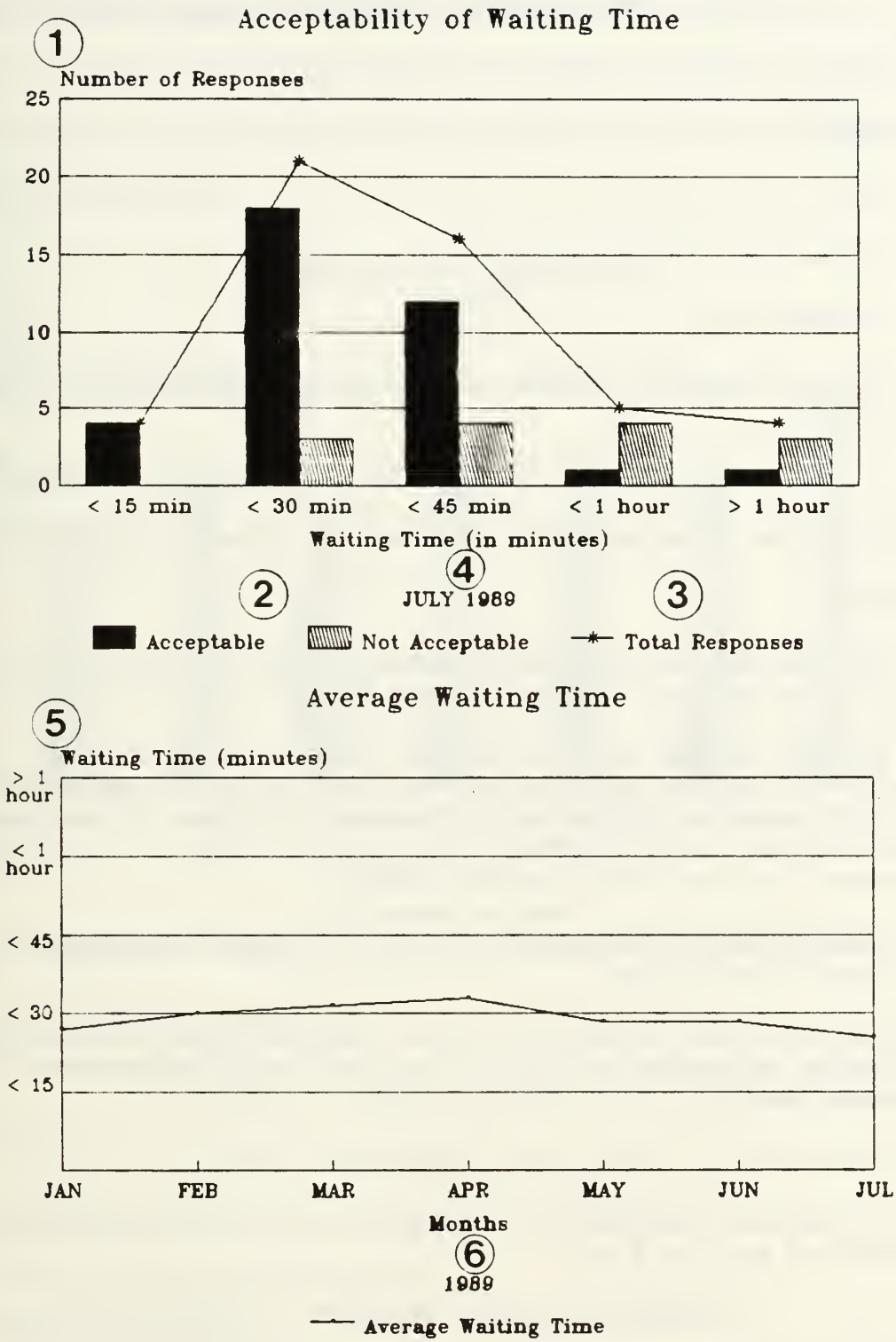


Figure 72. Waiting Time Reports

The following fields are necessary for creating the two part waiting time reports.

- Month.
- Year.
- Section Code. For clinic report only.
- Waiting Time.
- Waiting Acceptability. Required only for Part One, Acceptability of Waiting Time.

The following numbered items correspond to the numbers shown in Figure 72 and explain the data manipulations and calculations required to produce the report.

1 The total number of responses for each possible answer to survey question 3A are graphed along the Y-axis based on note 2 below.

2 For each possible answer to question 3A, the number of patients who responded to question 3B as acceptable and unacceptable are counted and each count is graphed as a separate bar. For example, in the figure, for those patients that said it took them less than 30 minutes to see a doctor, 17 said this was acceptable and three said this was unacceptable.

3 The total response line shows the total responses for each possible answer to question 3A, waiting time.

4 This is the month and year of the survey. This data is input by the user when requesting the report and is used by the program to select the appropriate survey database records.

5 In Part Two, the waiting time is graphed on the Y-axis.

6 The responses to question 3A are averaged for each month of the desired year and plotted along the X-axis.

(3) Satisfaction Indicators (see Figure 73). Questions four through ten of the survey are statements for which the patient is asked to indicate his level or

degree of satisfaction ranging from five for excellent to one for unsatisfactory. The Satisfaction Indicator report shows the results of the survey in these seven areas, with the total number of responses for each level of satisfaction (one through five) graphed for each of the seven areas.

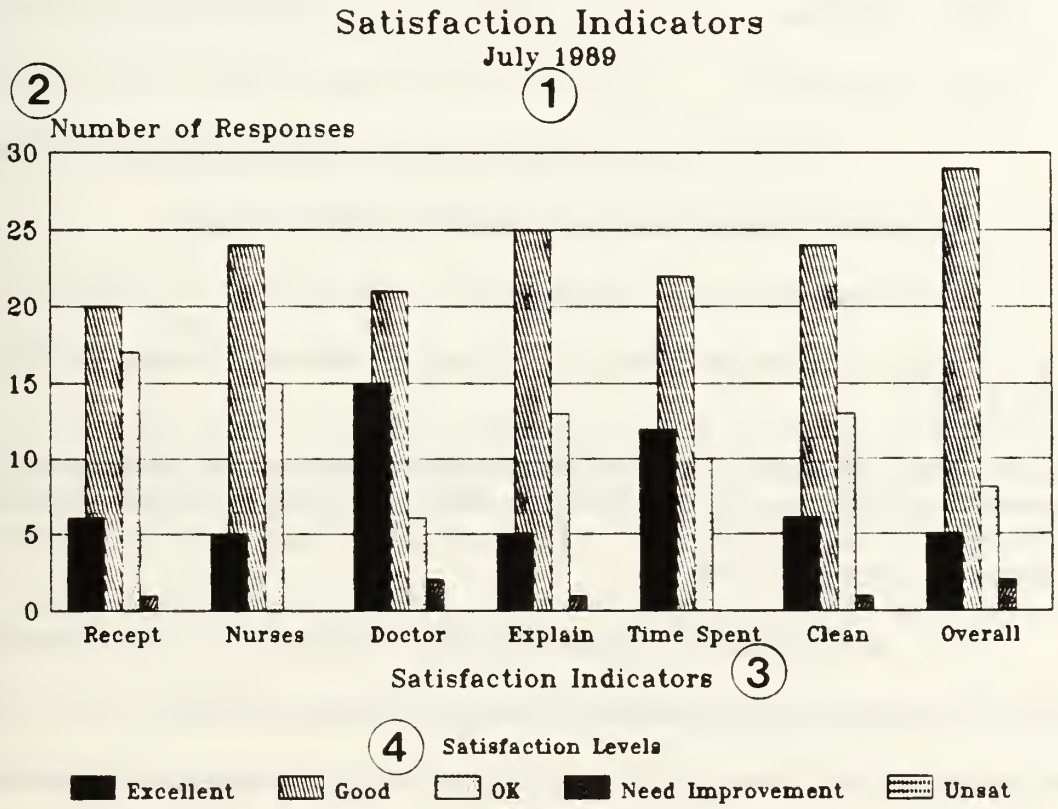


Figure 73. Satisfaction Indicators

The following fields are necessary for creating this report:

- Month.
- Year.
- Section Code. For clinic report only.
- Receptionist Courtesy.

- Nursing Courtesy.
- Doctor Courtesy.
- Procedure Explanations.
- Time Spent With Doctor.
- Clinic Cleanliness.
- Overall Satisfaction.

The following numbered items correspond to the numbers in Figure 73 and explain the data manipulations required to produce the graph.

1 The Month and Year for the report.

2 The total number of responses in each level of satisfaction are graphed along the Y-axis.

3 For each satisfaction indicator (e.g., doctor courtesy, overall satisfaction) the number of responses in each level of satisfaction (note 4 in the figure) are counted and the total for each level is graphed as a separate bar for all of the indicators along the X-axis.

(4) Average Satisfaction Levels (see Figure 74). This two part report shows the average level of satisfaction for each satisfaction indicator for the calendar year. It is presented in two reports to simplify viewing. The Department Chief prefers line graphs to enhance trend identification so the seven indicators are divided into two groups. Part One shows the indicators which are primarily personnel oriented (e.g., courtesy) plus overall satisfaction. Part Two shows the remaining indicator's averages.

The following fields are necessary to create the two part report:

- Month.
- Year.
- Section Code. For clinic report only.

- Receptionist Courtesy. For Part One only.
- Nursing Courtesy. For Part One only.
- Doctor Courtesy. For Part One only.
- Overall Satisfaction. For Part One only.
- Procedure Explanations. For Part Two only.
- Time Spent With Doctor. For Part Two only.
- Clinic Cleanliness. For Part Two only.

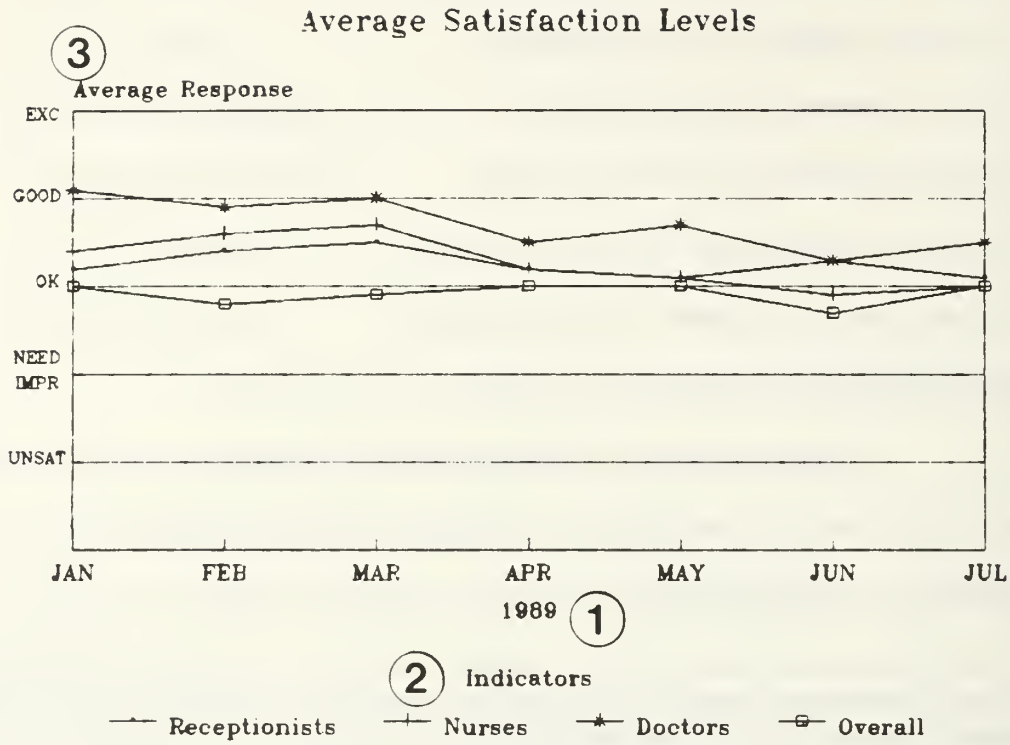
The following numbered items correspond to the numbers in Figure 74 and explain the data manipulations required to produce this report.

1 This is the requested year of the survey data for the report.

2 The average of all of the values (ranging from one to five) for each indicator is calculated for each month of the specified year. The satisfaction indicators are plotted along the X-axis using different line styles for each indicators average values.

3 The average response for each indicator is correlated to it's equivalent narrative description, i.e., 1 = unsatisfactory, and these are shown along the Y-axis.

(5) Doctor Satisfaction Report (see Figure 75). This report is a table showing the average responses for a given month for four of the satisfaction indicators which most directly relate to the patient's interactions with the doctors. This report is produced for all of the doctors in the department and allows the Department Chief to track individual doctor's survey results.



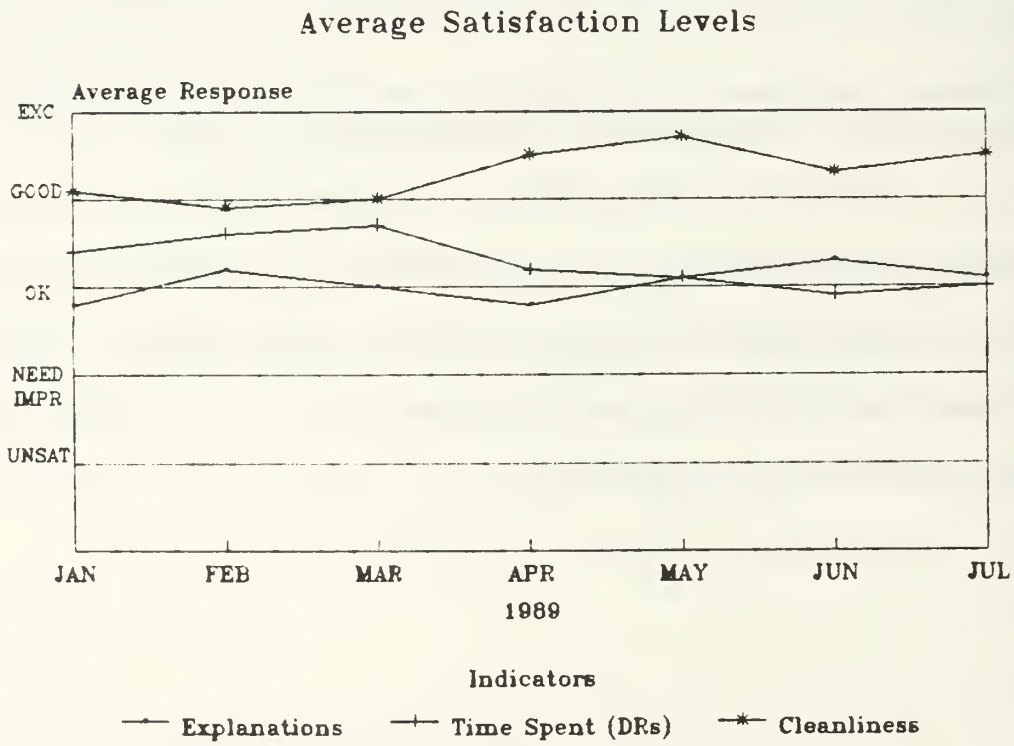


Figure 74. Average Satisfaction Levels Report

DOCTOR SATISFACTION REPORT
July 1989

(2) DOCTOR	COURTESY	(1) EXPLANATIONS	TIME SPENT	GENERAL SATISFACTION	(4) OVERALL AVG
Baker	3.5	3.0	4.0	4.0	3.6
Foster	4.0	4.2	3.6	4.0	4.0
Kugler	3.0	2.8	3.4	3.2	(5) 3.1
Lorenzen	4.5	4.0	4.7	4.5	4.4
Mork	4.0	4.0	3.7	4.0	3.9
Yeash	3.0	4.3	2.8	4.0	3.5

(3)

Figure 75. Doctor Satisfaction Report

The following fields are necessary for creating this report:

- Year.
- Month.
- Doctor Name.
- Doctor Courtesy.
- Procedure Explanations.
- Time Spent With Doctor.
- Overall Satisfaction.

The numbered items below correspond to Figure 75 and explain how the data for the report is obtained.

1 This is the month and year for the report.

2 Each doctor's name is printed in the first column in alphabetical order.

3 For each doctor, the average response for the four indicators is calculated and placed in the corresponding column adjacent to the doctors name.

4 The value of all four indicators is averaged to produce an overall doctor satisfaction average.

5 An additional indicator of a physician's consistency could be computer here, e.g., standard deviation or some similar measure of dispersion.

(6) Patient Comments (see Figure 76). This report is a print out of all of the patient comments entered into the survey database for the desired month and year. It allows the Department Chief to review any constructive criticisms or noteworthy suggestions made by the patients and pinpoint other trouble areas (or outstanding areas) which cannot be identified from the quantitative portion of the survey.

The fields necessary to produce this report are listed below:

- Month.
- Year.
- Patient Comments to Enter?
- Comments.

The numbered items below, corresponding to Figure 76, explain the comment report.

1 The month and year of the report is listed at the top.

2 The records in the database which have the Comments field filled (indicated by a "Y" in the Patient Comments to Enter field) are printed in record number order for the month and year.

```
                                PATIENT COMMENTS
 (2)                        (1)   July 1989
I THINK THE LAB AND PHARMACY TAKE TOO LONG, I WAITED FOR MORE THAN AN HOUR
TO GET MY PRESCRIPTION FILLED.

THE FAMILY PRACTICE CLINIC IS GREAT HERE.  I WOULD LIKE TO BE ABLE TO SEE
MY ASSIGNED DOCTOR MORE OFTEN, DR. YEASH, BUT WHOEVER SEES ME IS ALWAYS
VERY COURTEOUS AND HELPFUL.

I NEVER GET TO SEE THE DOCTOR WHICH MY FAMILY IS ASSIGNED TO, WHY BOTHER
GOING THROUGH THE HASSLE OF SIGNING UP FOR A SPECIFIC DOCTOR?

ITS TOO COLD IN THE EXAMINING ROOMS.
```

Figure 76. Patient Comments Report

6. Productivity Information System (see Program, Appendix G)

a. Data Structures

The productivity system UCD is shown in Figure 77. The functions of the productivity system depend on visit information obtained from the Patient Administration Division for each section of the department. The method of obtaining the visit information is described in the next section, Inputs.

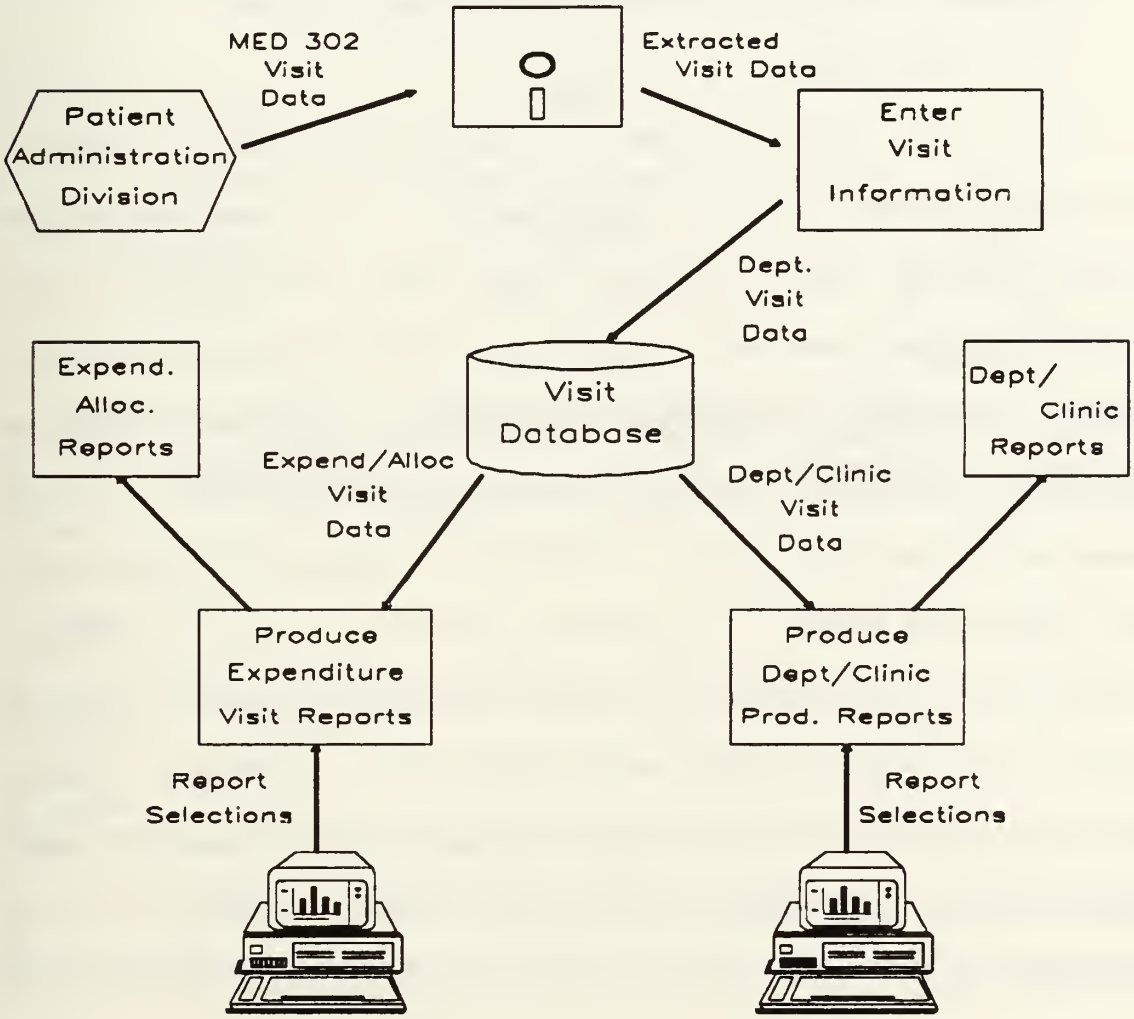


Figure 77. Productivity System User Concept Diagram

The visit information is entered into the visit database which consists of the following fields:

- Fiscal Year. The fiscal year is used so the number of visits in each section can be directly compared to the section's expenditures for each month. Expenditure data is maintained in the budget database by fiscal year.
- Month.
- Section Code.
- Number of Visits. The number of patient visits for each section within the department as reported by the Patient Administration Division.

b. Data Inputs

The productivity system menu hierarchy chart is shown in Figure 78. Visit data for the entire hospital is collected monthly by the Patient Administration Division (PAD) for RMD. PAD enters each section's visit information into a spreadsheet program which they use to create the MED 302 report, discussed in Chapters III and IV. For the department productivity system, the visit information can be extracted from the PAD MED 302 file for entry into the visit database. Table VI shows the locations of visit data in the MED 302 spreadsheet file corresponding to each section in the DFPCM. As can be seen in the Table VI, some calculations on the data in the file are necessary to accurately correlate the visit data to the DFPCM sections. For example, the CTMC section visit count is a combination of multiple lines and columns from the MED 302 file. The disparity occurs because PAD divides section visits into subdivisions for their hospital reporting requirements. For the Department Chief's purposes, only the total visit information for each section is necessary.

Table VI. MED 302 DATA EXTRACTION LOCATIONS

SECTION CODE	LOCATION IN MED 302 (LINE #'s & COL's)
FPC	SUM (134 A & B TO 140 A & B)
CFP	SUM (134C TO 140C)
EMS	SUM (147 A & B)
FSO	SUM (148 A & B)
GOC	SUM (141 A & B)
POM	141D
CTM	SUM (141C, 171C, 174C, 141F)
FHL	SUM (141E, 171E, 174E)

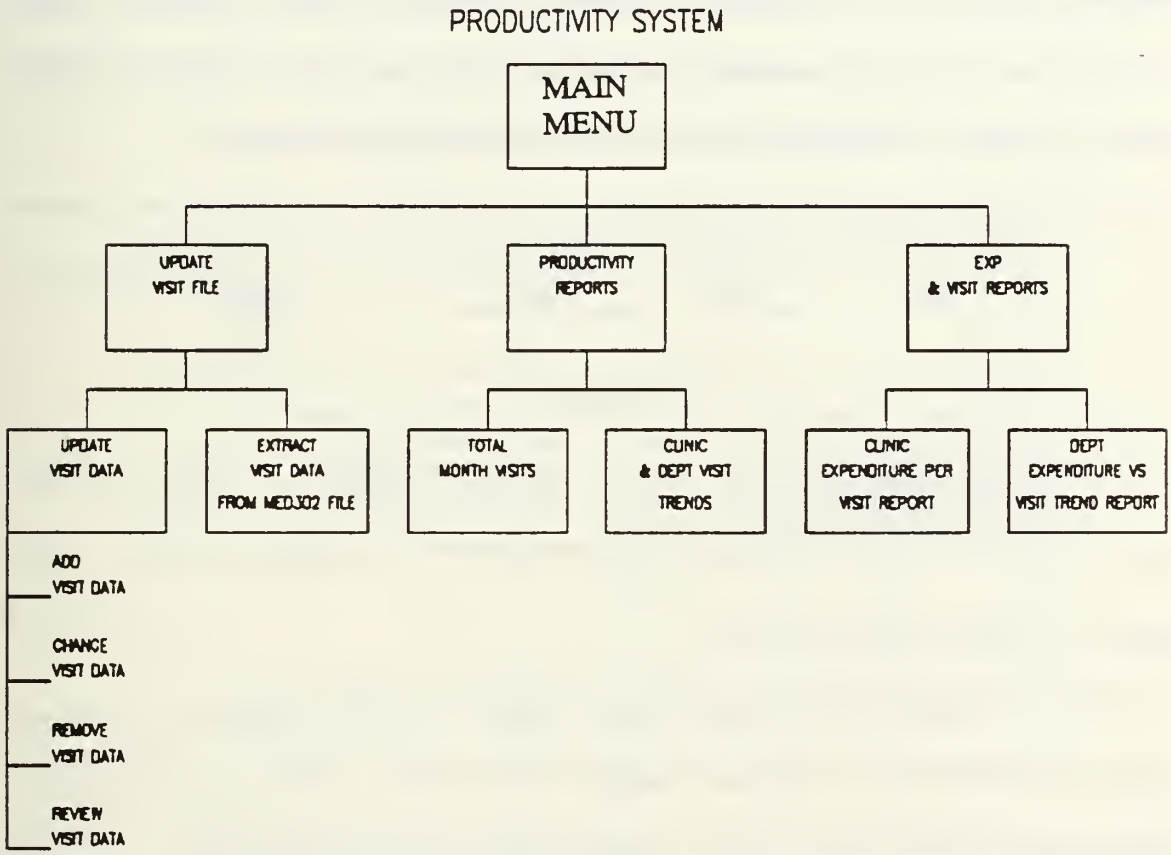


Figure 78. Productivity Menu Hierarchy Chart

The visit information in the MED 302 file can be extracted for entry into the visit database in one of two general ways, either automatically or manually.

To extract the visit data automatically, an extraction program can be written to take data from the MED 302 spreadsheet file and load it on a floppy disk. Another program is necessary to transfer the data from the disk into the department productivity system's visit database in the correct format.

Manual extraction would require PAD to print the department's sections and visit data, monthly, to a paper report. The user of the department productivity system would select the "Add Visit Data" option from the "Update Visit Data" menu and enter the visit data contained in the printed report provided by PAD. The input screen for adding, changing, or removing visit data is shown in Figure 79.

Fiscal Year	Month	Section Code	# of Visits

Section Codes

Family Practice Clinic	FPC	Consolidated Troop Clinic	CTM
General Outpatient Clinic	GOC	Fort Hunter Liggett	FHL
CTMC Family Practice	CFP	Ambulance Section	AMB
Emergency Medical Service	EMS	Flight Surgeon Office	FSO
Presidio of Monterey	POM		

Figure 79. Visit Data Input Screen

Either of the above input methods is technically feasible. However, there are tradeoffs in choosing one method over the other. The automated method eliminates the need for manual entry of each section's visit data every month. On the other hand, the amount of data entry is relatively small. There are eight sections with visit data requiring approximately 11 keystrokes for each section (see Figure 79). Thus, in any given month, it would require approximately 90 keystrokes to enter the new visit information into the database. The main drawback to automating the

information extraction lies in the MED 302 file itself. PAD created the spreadsheet file for their own use in creating the hospital's MED 302 report. The DFPCM has no control over PAD's use of the spreadsheet file. Therefore, any changes PAD might make to the file would cause any extraction program referencing specific lines and columns to fail. Other changes in the method of visit data collection or reporting would likely require changes in the extraction programs. Both extraction methods require cooperation and coordination between the DFPCM and the PAD, with the automated method requiring considerably greater effort.

The method of extraction aside, once the data is contained in the database, the user can view the data by selecting one of the outputs described in the following section.

c. Outputs

(1) Review Visit Data. The review is an option under the "Update Visit Data" menu and allows the user to view the entire visit database. All of the database fields are displayed in the standard review format described in Section C.2.b., Review Screens.

(2) Department Monthly Visit Report (see Figure 80). The monthly visit report is a bar graph showing each sections' total visits for the desired fiscal year and month. This report provides the Department Chief with a quick indication of the level of work done by each of the eight sections reporting visit information. All of the visit database fields are necessary to create the monthly visit report.

The following numbered items correspond to the numbers in Figure 80 and explain the monthly visit report:

1 The month and year for the report.

2 The total number of visits (in thousands) for each clinic is plotted on the Y-axis.

3 The eight department sections are plotted along the X-axis.

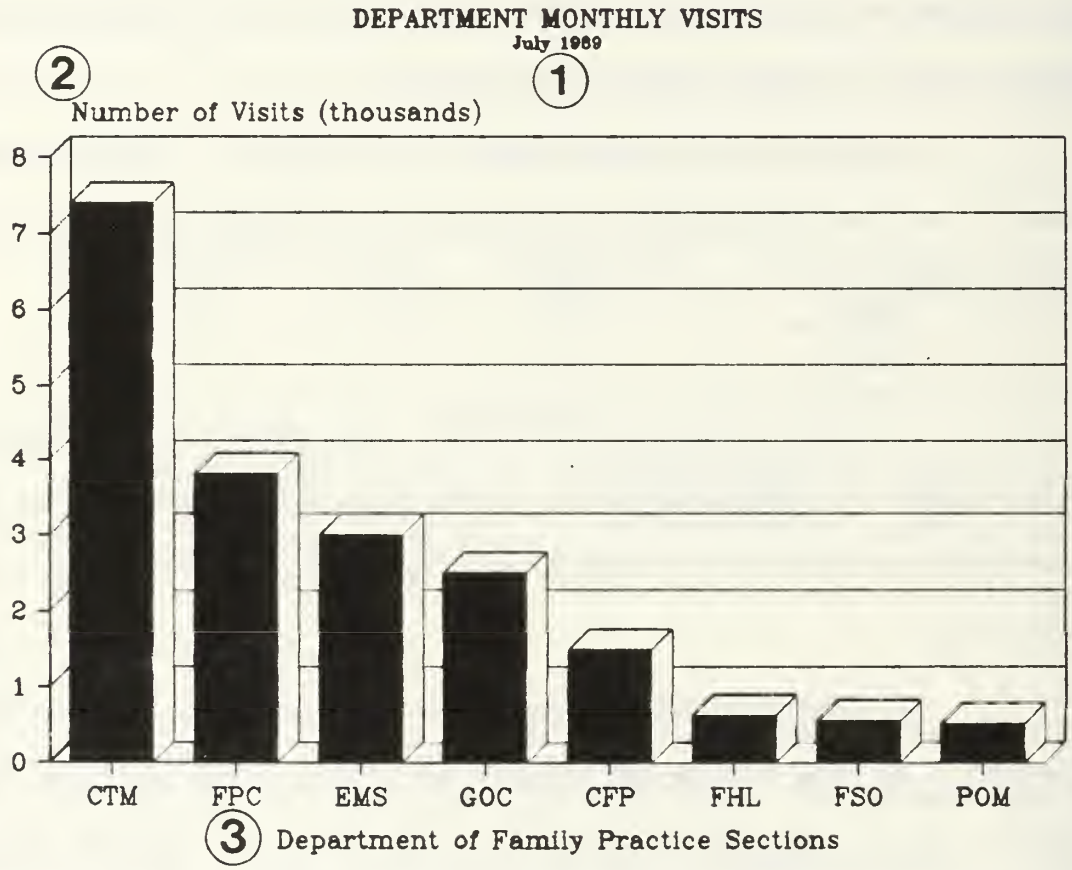


Figure 80. Department Monthly Visit Report

(3) Visit Trend Report (see Figure 81). The visit trend report is a multiple graph report showing fiscal year trends in patient visits for each section. To simplify viewing, only two sections are shown on each graph resulting in four graphs

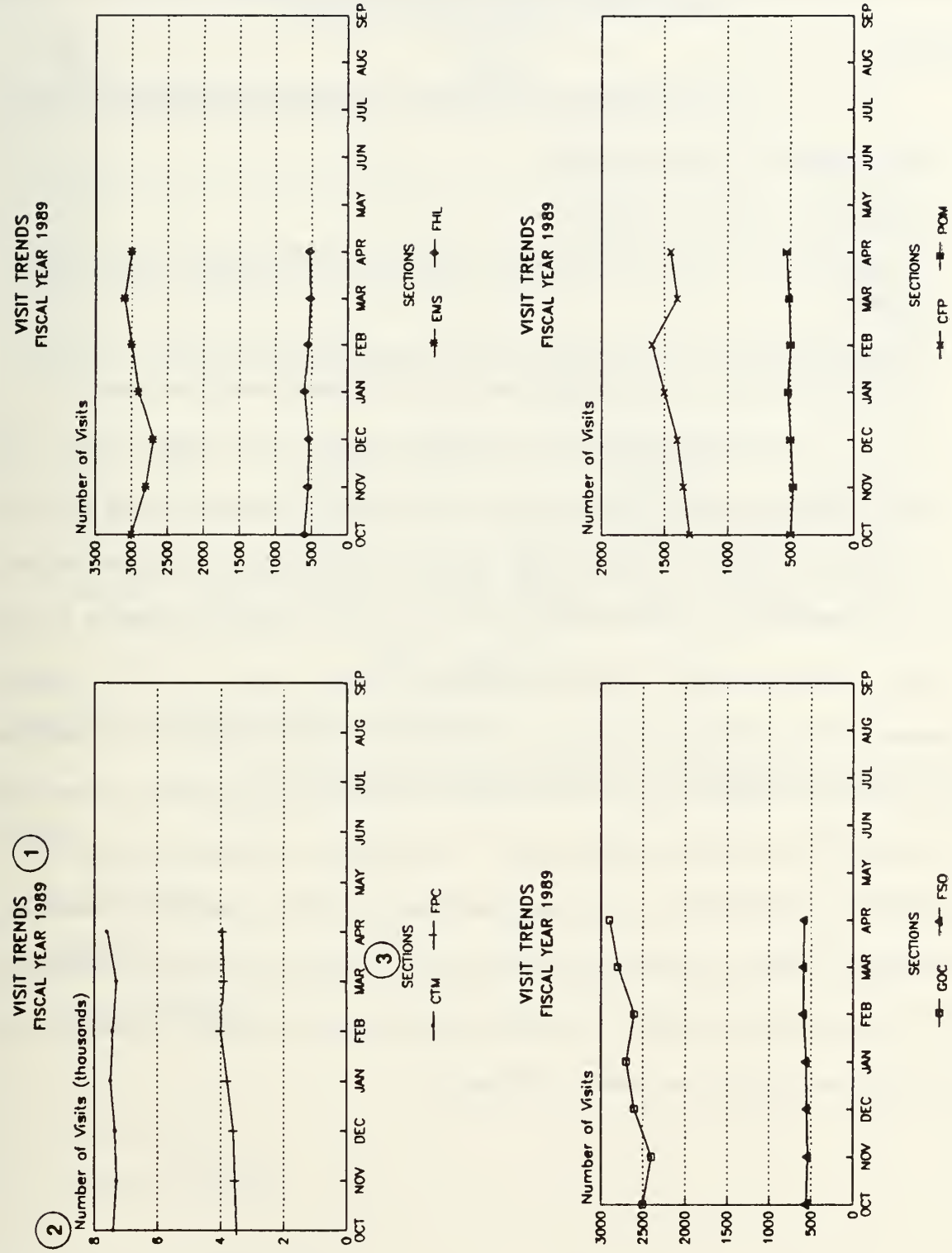


Figure 81. Visit Trend Report

for the entire report. All of the visit database fields are required for the visit trend report.

The following numbered items correspond to the numbers in Figure 81 and explain the visit trend report.

1 The fiscal year of the report.

2 The number of visits for each clinic is plotted in the appropriate graph on the Y-axis.

3 Each month of the reported fiscal year is graphed along the X-axis. There are two sections plotted on each graph, each with a different trend line style.

(4) Expenditure/Visit Comparison Report (see Figure 82). The expenditure/visit comparison report shows the dollar amount spent per patient visit. To obtain the data necessary to produce this report, the information in the visit database must be combined with information from two of the databases maintained by the budget system: the APC monthly expenditure database; and the APC database. Because of the relationship between the APC and the Section Code, the visit database must first be combined with the APC database to relate the visit database section code with the APCs used in the budget system. The resulting combination must further be combined with the APC monthly expenditure database. This combination is necessary to relate the number of visits for a particular section code to that section's expenditures for the same month and fiscal year desired for the report. The three databases and their field relationships are shown in Figure 83.

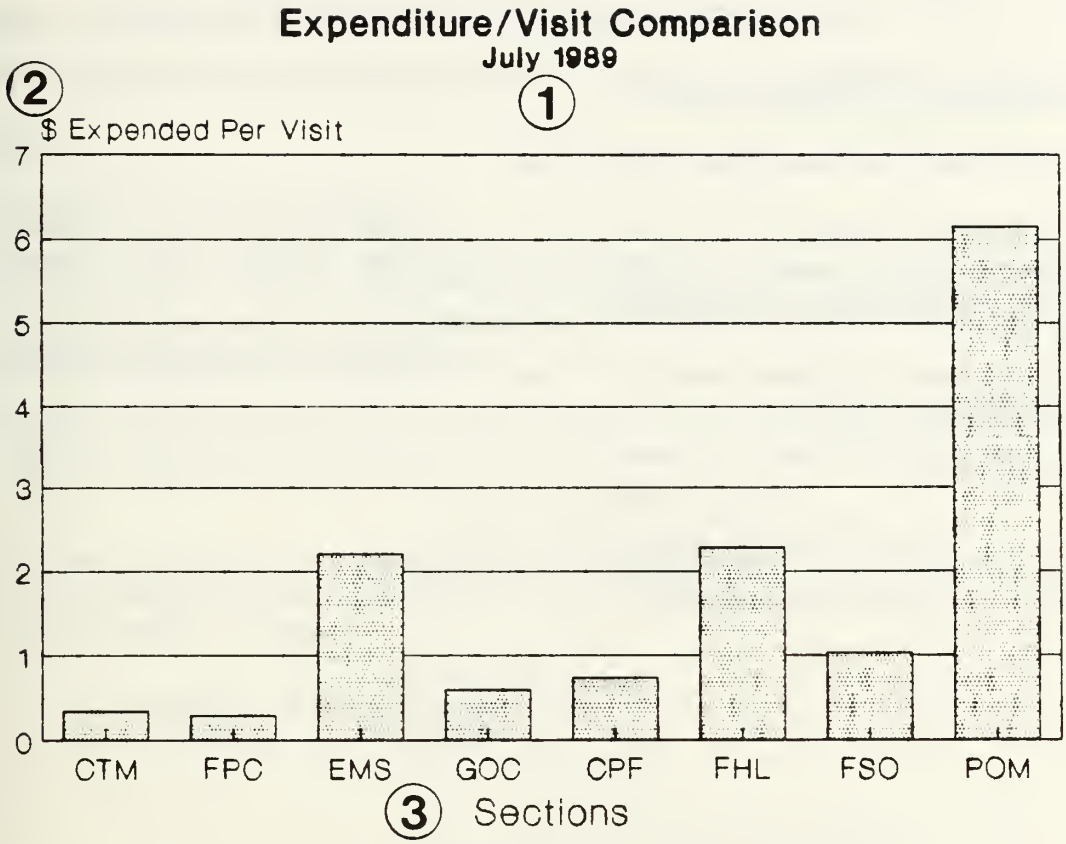


Figure 82. Expenditure/Visit Comparison

The combined data fields necessary to create the report are listed below:

- Fiscal Year.
- Month.
- Section Code.
- APC.
- Expenditure.
- Number of Visits.

The following numbered items correspond to the numbers in Figure 82 explaining the comparison report.

1 The month and fiscal year of the report.

2 The dollar expenditure per patient visit is plotted along the Y-axis. For each section, divide the monthly expenditure by the monthly number of visits to arrive at the expenditure per visit amount.

3 Each section is plotted along the X-axis with a vertical bar showing the dollar expenditure per visit.

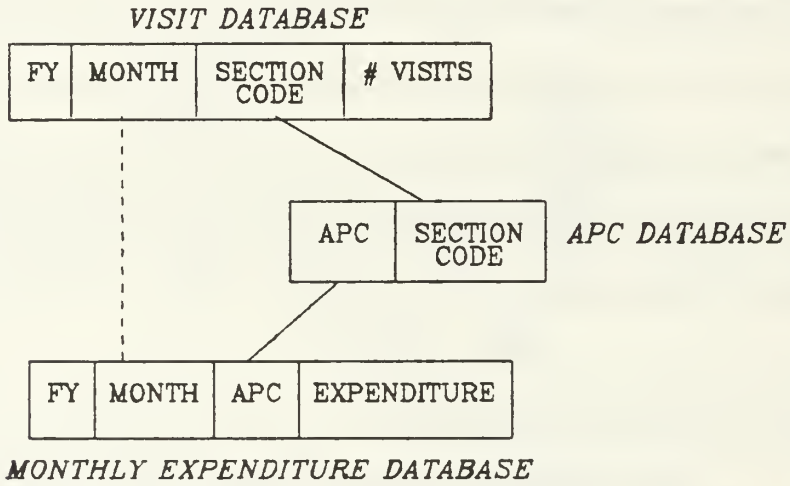


Figure 83. Productivity and Budget Database Relationships

(5) Department Expenditure and Visit Trend Report (see Figure 84). The expenditure and visit trend report allows the Department Chief to rapidly assess the general direction department spending is taking in comparison to the department's workload. The process for obtaining the information for the report is similar to that used in the Expenditure/Visit Comparison report discussed previously. The same combined database fields are used in both reports, however, the calculations for each report are different.

The following numbered items correspond to the numbers in Figure 84 and explain the data calculations required to produce the expenditure and visit trend report.

1 The fiscal year of the report.

2 The dollar amount of department expenditures for each month of the fiscal year. Sum the eight section's expenditure data for each month to obtain the total monthly department expenditures.

3 The number of department visits for each month of the fiscal year. Sum the eight sections' visit data for each month to obtain the total monthly department visits.

4 The dollar amount of expenditures and the number of visits are both plotted on the Y-axis. The numbers along the Y-axis represent both thousands of dollars and thousands of visits.

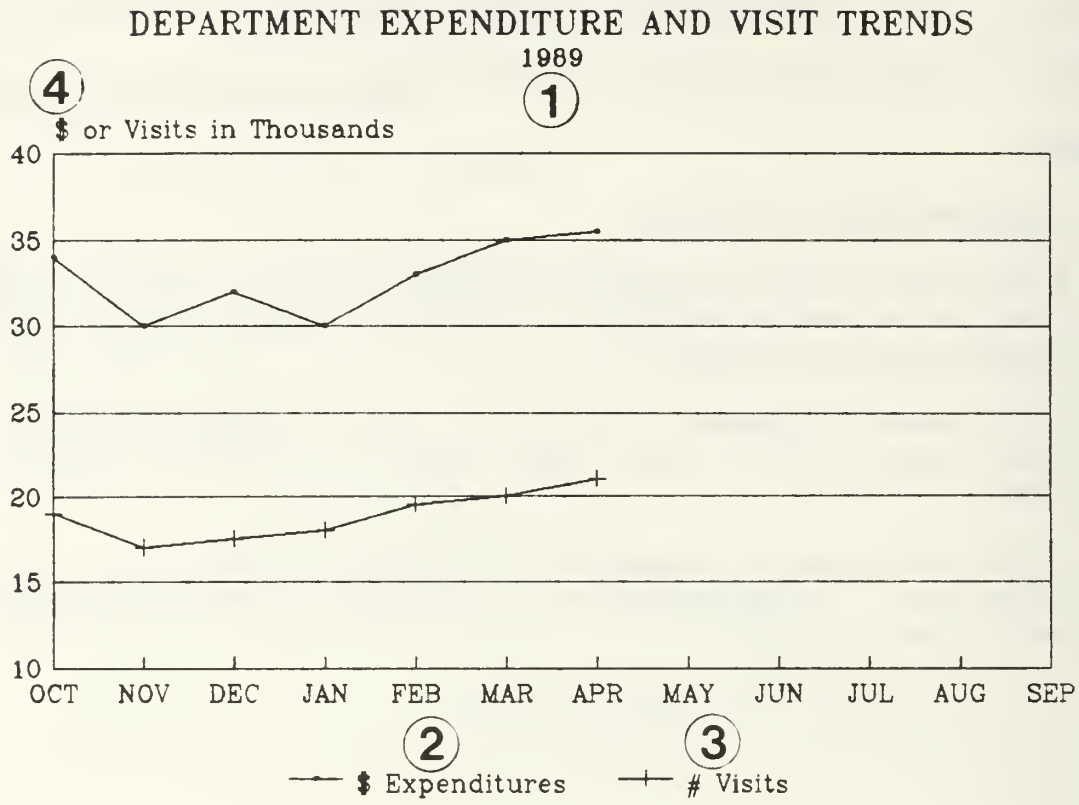


Figure 84. Department Expenditure and Visit Trend Report

VI. CONCLUSIONS AND RECOMMENDATIONS

A. PROJECT SYNOPSIS

We began our information systems development project for Silas B. Hays by studying the current literature on information systems development and hospital information systems. The findings of this literature research were presented in Chapter II. In summary, there were a multitude of systems development methodologies from which to choose. We determined that a combination of two commonly used methodologies, a traditional systems development life cycle and a prototyping methodology, would best fit our needs. The life cycle methodology provided us with the structured techniques to develop the proposed information system, while prototyping allowed us to quickly develop the user interfaces necessary to rapidly identify user requirements. Through research, we determined that the critical nature of the health care environment influences the information systems used by hospitals. There exists a dichotomy between the goals and objectives of hospital administrators and health care providers. This dichotomy influences the way in which information systems are used to meet these differing objectives. Additionally, the resource constraints within the hospital create pressures when considering the use of information systems by both administrators and health care providers. This was particularly true in the case of the DFPCM, whose Chief is both a health care provider, and by necessity, an administrator.

We conducted interviews with senior hospital managers to obtain a clear problem definition and to focus our research. The feedback from these discussions directed us

to the Department of Family Practice and Community Medicine (DFPCM). This large, multi-service department greatly affects overall hospital operations. Chapter III provided a detailed look at the DFPCM: its structure and its current information systems. The Chief of the DFPCM commands more than 150 people and manages an annual budget of nearly half a million dollars. In initial discussions with the Chief, he identified and prioritized his most critical management concerns: budget, equipment, personnel, scheduling, patient satisfaction, and productivity. The information systems relating to these six management areas became the subject of our research.

Discussions with the Department Chief and his senior department personnel helped us identify their requirements for information in each of the six areas. In analyzing their needs, and comparing the needs with the current information systems, we were able to propose improvements to the systems in Chapter IV. Those improvements included: the use of databases; simpler data collection; automated data manipulations (in some cases); concise, summary reports; graphical reports; trend analysis capabilities; and improved automated user interfaces (where applicable).

The improvements proposed in Chapter IV were prototyped in Chapter V to produce a detailed requirements analysis for the six information systems in the DFPCM. The databases, user interface screens, and outputs of the systems were designed to help us pinpoint the user's requirements. The Department Chief and other department managers provided feedback, allowing us to tailor the prototyped models to their specifications. Time constraints allowed only one iteration of the prototyping process. Further iterations would further enhance the requirements analysis presented in Chapter V.

The general conclusions resulting from our research are presented in the following section. The recommendations for follow on thesis study are discussed in the last section of this chapter.

B. CONCLUSIONS

The requirements analysis presented in this thesis is the first step in the development life cycle for the DFPCM information system. With the existing information system defined and the requirements identified and analyzed, the system can be fully designed, constructed, and implemented to meet the needs of the targeted department users.

The process of requirements analysis is a complex task which if done poorly will likely result in a substandard system development. The complexity of this task leads to many difficulties which the analysts must face during the development process.

Identifying the system's target audience and obtaining a clear problem definition are essential first steps in the process. Without a clear understanding of the intended users and their related problems, the analyst's energies and resources are wasted on unimportant or non-existent requirements. Starting on the right track early in the process requires the involvement of senior management to obtain the input from those personnel who are in a position to identify problem areas. Once involved in the thesis study, the senior managers at Silas B. Hays were quick to identify the DFPCM as potential benefitors of an improved information system. Frequent and early interactions with the users were critical in identifying the detailed requirements of each of the subsystems presented.

Selecting the "best" development methodology is the next hurdle in the development process. Given the large number of methodologies in existence, it is doubtful there is one "best" method. Rather, the analyst must choose the methodology most suited to the task at hand, with which he has the most experience, or simply, one which he feels most comfortable using. Decisions such as whether to use data flow diagrams or user concept diagrams depends on a number of factors, the bottom line being whether or not the analyst can use the method effectively to build a high quality system acceptable to the intended users.

The use of prototyping in the early stages of system's development was shown to be beneficial in identifying the inputs, interfaces, and output requirements desired by the intended users. Using separate software packages to design the various prototypes was time consuming and did not allow direct integration of the input and output prototype programs. The use of a dedicated, integrated prototype tool which does all of these processes could have greatly enhanced our productivity in prototype development.

The project management of the system development is critical for an efficient and effective process. The division of labor, coordination of effort, and teamwork were important issues throughout the project. When these factors are missing or inadequate in project development, schedules slip and resources are wasted.

An important influence in the development project at Silas B. Hays is the complexity of the computer systems in place at the hospital. The lack of integration of these systems frustrates the development of an information system and ultimately causes more work for the users in duplicating the data collection and reporting efforts.

The integrated Composite Health Care System planned for implementation in the early 1990s does not answer the needs of the department managers today. The new Director of Information Management at Silas B. Hays has begun planning for solving the integration problems using networking technology.

A valuable lesson learned during the writing of this thesis was that the use of automation is not always appropriate in every part of an information system. In some cases, automation would actually create more work in relation to any benefits gained. With the intense workload of the department's personnel, every effort must be made to reduce the amount of work required while providing the best possible information to the department chief.

C. RECOMMENDATIONS AND FOLLOW-ON THESIS WORK

The requirements analysis presented in this thesis should be used to further design and implement a complete information system for the DFPCM. The hospital's Information Management Division can use the prototype program listings, and input and output examples to develop a working system using the software packages currently available in the hospital, or they can use the requirements to justify purchasing or developing other software as required to implement the systems. Possible follow on thesis work in this area includes designing, constructing, and/or implementing an information system from a previously developed requirements analysis. Evaluating and selecting software and hardware alternatives, including thorough economic analyses, provide additional possibilities for future research.

The information which could be provided to hospital managers by a completed system may be useful to other hospital departments. Follow on thesis work could

involve expanding the initial requirements analysis of this thesis to other departments or the hospital as a whole.

Additional follow-on thesis work include: research into the design of an optimization model for the doctor scheduling process and further research into the doctor productivity issues discussed in Chapter IV.

At a minimum, the analysis contained in this thesis can be used by senior hospital managers to identify the shortcomings of the existing information systems in providing department managers with the high quality information they require to successfully manage the many resources needed to accomplish their missions.

APPENDIX A. DATA DICTIONARY

BUDGET DATABASE FILES

APC FILE				
FIELD NAME	FIELD TYPE	FIELD LENGTH/ DECIMALS		DESCRIPTION OF FIELD
APC	CHARACTER	4	0	ACCOUNT PROCESSING CODE : FORMAT A999
SECTION	CHARACTER	20	0	NAME OF SECTION ASSIGNED TO APC CODE
SECTCODE	CHARACTER	3	0	SECTION CODE
POC	CHARACTER	15	0	POINT OF CONTACT
TELEPHONE	NUMERIC	9	0	TELEPHONE NUMBER : FORMAT (999)999-9999
STATUS	CHARACTER	1	0	STATUS CODE [A:ACTIVE, I:INACTIVE]

QTRALLOC FILE				
FIELD NAME	FIELD TYPE	FIELD LENGTH/ DECIMALS		DESCRIPTION OF FIELD
APC	CHARACTER	4	0	ACCOUNT PROCESSING CODE
FY	NUMERIC	2	0	FISCAL YEAR OF ALLOCATION
QUARTER	NUMERIC	1	0	QUARTER WITHIN THE FISCAL YEAR
ALLOCATION	MONEY	11	2	BUDGET ALLOCATION FOR THE QUARTER

MOEXP FILE				
FIELD NAME	FIELD TYPE	FIELD LENGTH/ DECIMALS		DESCRIPTION OF FIELD
APC	CHARACTER	4	0	ACCOUNT PROCESSING CODE
MONTH	NUMERIC	2	0	MONTH THE EXPENSE OCCURRED
FY	NUMERIC	2	0	FISCAL YEAR OF EXPENDITURE
QUARTER	NUMERIC	1	0	COMPUTED, BASED ON MONTH
EXPENSES	MONEY	11	2	DOLLARS EXPENDED FOR MONTH

EQUIPMENT DATABASE FILES

EQUIP FILE				
FIELD NAME	FIELD TYPE	FIELD LENGTH/ DECIMALS		DESCRIPTION OF FIELD
EQCODE	NUMERIC	7	2	EQUIPMENT REQUEST NUMBER (GENERATED)
SECTCODE	CHARACTER	3	0	SECTION CODE
REQDATE	DATE	8	0	DATE OF ORIGINAL REQUEST
DESCRIPT	CHARACTER	20	0	DESCRIPTIVE NAME OF EQUIPMENT NEEDED
REQTYPE	CHARACTER	4	0	TYPE OF EQUIPMENT REQUEST, i.e. CEEP
PRIORITY	NUMERIC	2	0	PRIORITY OF REQUEST WITHIN TYPE OF EQUIP
URGCODE	NUMERIC	1	0	URGENCY OF REQUEST (0 TO 4)
QTY	NUMERIC	3	0	QUANTITY OF EQUIPMENT NEEDED
UNITPRICE	MONEY	9	2	PRICE PER UNIT OF EQUIPMENT REQUESTED
EXTPRICE	MONEY	10	2	EXTENDED PRICE OF EQUIPMENT
STATUS	CHARACTER	2	0	STATUS OF REQUEST IN CODED FORM
COMMENTS	CHARACTER	20	0	COMMENTS ON REQUEST

EQHIST FILE				
FIELD NAME	FIELD TYPE	FIELD LENGTH/ DECIMALS		DESCRIPTION OF FIELD
SECTCODE	CHARACTER	3	0	SECTION CODE
DESCRIPT	CHARACTER	20	0	DESCRIPTIVE NAME OF EQUIPMENT NEEDED
REQTYPE	CHARACTER	4	0	TYPE OF EQUIPMENT REQUEST, i.e. CEEP
QTY	NUMERIC	3	0	QUANTITY OF EQUIPMENT NEEDED
EXTPRICE	MONEY	10	2	EXTENDED PRICE OF EQUIPMENT
REQDATE	DATE	8	0	DATE OF ORIGINAL REQUEST
XFERDATE	DATE	8	0	DATE TRANSFERRED TO HISTORICAL FILE
MO_TO_COMP	NUMERIC	3	0	MONTHS IT TOOK TO COMPLETE REQUEST
COMMENTS	CHARACTER	20	0	COMMENTS ON REQUEST

PERSONNEL DATABASE FILES

PERSONNEL FILE				
FIELD NAME	FIELD TYPE	FIELD LENGTH/ DECIMALS		DESCRIPTION OF FIELD
IDCODE	CHARACTER	5	0	PERSONNEL IDENTIFICATION CODE
LNAME	CHARACTER	20	0	LAST NAME
FNAME	CHARACTER	15	0	FIRST NAME, MIDDLE INITIAL
RANK	CHARACTER	3	0	RANK OF PERSON
BRANCH	CHARACTER	2	0	BRANCH OF PERSON
MOS	CHARACTER	5	0	MILITARY OCCUPATIONAL SPECIALTY CODE
STATUS	NUMERIC	1	0	RESIDENCY CODE (IF IN RESIDENCY PROGRAM)
ALOSS	DATE	8	0	ANTICIPATED DATE OF LOSS
ARRDATE	DATE	8	0	ARRIVAL DATE IN DEPARTMENT
TDA_PARA	NUMERIC	3	0	TDA PARAGRAPH NUMBER ASSIGNED TO PERSON
TDA_LINE	CHARACTER	3	0	TDA LINE NUMBER ASSIGNED TO PERSON
TDA_POSN	NUMERIC	2	0	TDA POSITION NUMBER ASSIGNED TO PERSON

PERSONAL FILE				
FIELD NAME	FIELD TYPE	FIELD LENGTH/ DECIMALS		DESCRIPTION OF FIELD
IDCODE	CHARACTER	5	0	PERSONNEL IDENTIFICATION CODE
ADDRESS	CHARACTER	20	0	PERSON'S ADDRESS (HOME)
CITY	CHARACTER	20	0	CITY (HOME)
STATE	CHARACTER	2	0	STATE (HOME)
ZIPCODE	NUMERIC	9	0	ZIPCODE + 4 (HOME)
WIFE	CHARACTER	10	0	WIFE'S NAME
CHILDREN	CHARACTER	25	0	CHILDREN'S FIRST NAMES AND AGES
TELEPHONE	NUMERIC	9	0	TELEPHONE NUMBER WITH AREA CODE (HOME)
DOR	DATE	8	0	DATE OF RANK
COMMENTS	CHARACTER	30	0	COMMENTS (PERSONAL)

TDA FILE				
FIELD NAME	FIELD TYPE	FIELD LENGTH/ DECIMALS		DESCRIPTION OF FIELD
TDA_PARA	NUMERIC	3	0	TDA PARAGRAPH NUMBER
TDA_LINE	CHARACTER	3	0	TDA LINE NUMBER
TDA_POSN	NUMERIC	2	0	TDA POSITION NUMBER
JOB_TITLE	CHARACTER	20	0	OFFICIAL JOB TITLE AS STATED ON TDA
APC	CHARACTER	4	0	ACCOUNT PROCESSING CODE
AUTH_BR	CHARACTER	2	0	AUTHORIZED BRANCH OF SERVICE
AUTH_GR	CHARACTER	2	0	AUTHORIZED GRADE (RANK)
AUTH_MOS	CHARACTER	6	0	MILITARY OCCUPATIONAL SPECIALTY CODE
AUTH	CHARACTER	1	0	AUTHORIZED SLOT CODE (FROM TDA)

ABSENCE FILE				
FIELD NAME	FIELD TYPE	FIELD LENGTH/ DECIMALS		DESCRIPTION OF FIELD
IDCODE	CHARACTER	5	0	PERSONNEL IDENTIFICATION CODE
FY	NUMERIC	2	0	FISCAL YEAR OF ABSENCE REQUEST
TYPE	CHARACTER	1	0	TYPE OF ABSENCE (CODED)
START	DATE	8	0	START DATE OF ABSENCE
END	DATE	8	0	END DATE OF ABSENCE
DURATION	NUMERIC	3	0	CALCULATE (START DATE - END DATE)
COMMENTS	CHARACTER	30	0	COMMENTS ABOUT ABSENCE REQUEST

CMEALLOC FILE				
FIELD NAME	FIELD TYPE	FIELD LENGTH/ DECIMALS		DESCRIPTION OF FIELD
FY	NUMERIC	2	0	FISCAL YEAR OF CME FUNDS ALLOCATION
ALLOCATION	MONEY	11	2	CME FUNDS ALLOCATION FOR THE FY

CMEREQ FILE				
FIELD NAME	FIELD TYPE	FIELD LENGTH/ DECIMALS		DESCRIPTION OF FIELD
IDCODE	CHARACTER	5	0	PERSONNEL IDENTIFICATION CODE
FY	NUMERIC	2	0	FISCAL YEAR OF REQUEST
TYPE	CHARACTER	1	0	TYPE OF CME REQUEST (ONE DIGIT CODE)
START	DATE	8	0	START DATE OF CME TRAVEL
END	DATE	8	0	ENDING DATE OF CME REQUEST
DURATION	NUMERIC	3	0	CALCULATED (END DATE - START DATE)
LOCATION	CHARACTER	20	0	LOCATION OF REQUESTED CONFERENCE
PURPOSE	CHARACTER	20	0	PURPOSE OF CME TRAVEL
TVLMODE	CHARACTER	1	0	MODE OF TRAVEL (CODED)
TRAVELCOST	MONEY	7	2	COST OF TRAVEL
PERDIEM	MONEY	7	2	PER DIEM COSTS OF TRAVEL
REGFEE	MONEY	7	2	REGISTRATION FEES
REIMB	MONEY	6	2	REIMBURSABLE EXPENSES
TOTALCOST	MONEY	8	2	TRAVELCOST+PERDIEM+REGFEE+REIMB
C_CODE	CHARACTER	1	0	COST CODE (A=ACTUAL OR E=ESTIMATED)

ABSENCE FILE				
FIELD NAME	FIELD TYPE	FIELD LENGTH/ DECIMALS		DESCRIPTION OF FIELD
IDCODE	CHARACTER	5	0	PERSONNEL IDENTIFICATION CODE
FY	NUMERIC	2	0	FISCAL YEAR OF ABSENCE REQUEST
TYPE	CHARACTER	1	0	TYPE OF ABSENCE (CODED)
START	DATE	8	0	START DATE OF ABSENCE
END	DATE	8	0	END DATE OF ABSENCE
DURATION	NUMERIC	3	0	CALCULATE (START DATE - END DATE)
COMMENTS	CHARACTER	30	0	COMMENTS ABOUT ABSENCE REQUEST

SATISFACTION DATABASE FILE

SURVEY FILE				
FIELD NAME	FIELD TYPE	FIELD LENGTH/ DECIMALS		DESCRIPTION OF FIELD
MONTH	NUMERIC	2	0	MONTH SURVEY TAKEN
YEAR	NUMERIC	2	0	YEAR SURVEY TAKEN
SECTCODE	CHARACTER	3	0	SECTION CODE (FROM SURVEY)
DOCTORNAME	CHARACTER	20	0	DOCTOR'S LAST NAME, FIRST NAME, MI
APPTDAYS	NUMERIC	1	0	NUMBER OF DAYS TO GET APPOINTMENT
ACCAPPT	NUMERIC	1	0	ACCEPTABILITY OF DAYS TO GET APPOINTMENT
RECORDS	NUMERIC	1	0	WERE MEDICAL RECORDS READY?
WAITTIME	NUMERIC	1	0	WAITING TIME SCORE
ACCWAIT	NUMERIC	1	0	ACCEPTABILITY OF WAITING TIME SCORE
RECEPT	NUMERIC	1	0	COURTESY OF RECEPTIONIST SCORE
NURSE	NUMERIC	1	0	COURTESY OF NURSES SCORE
DOCTORS	NUMERIC	1	0	COURTESY OF DOCTORS SCORE
EXPLAIN	NUMERIC	1	0	EXPLANATIONS OF PROCEDURES SCORE
TIMESPENT	NUMERIC	1	0	ADEQUACY OF TIME SPENT WITH DOCTOR SCORE
CLEAN	NUMERIC	1	0	CLEANLINESS OF CLINIC SCORE
SATIS	NUMERIC	1	0	GENERAL SATISFACTION SCORE
PATCOMMENT	CHARACTER	1	0	ARE THERE PATIENT COMMENTS TO ENTER?
COMMENTS	MEMO	10	0	COMMENTS MEMO FIELD

SCORE : NUMBER MARKED ON PATIENT'S SURVEY QUESTIONNAIRE

PRODUCTIVITY DATABASE FILE

VISIT FILE				
FIELD NAME	FIELD TYPE	FIELD LENGTH/ DECIMALS		DESCRIPTION OF FIELD
FY	NUMERIC	2	0	FISCAL YEAR OF VISIT INFORMATION
MO	NUMERIC	2	0	MONTH OF VISIT INFORMATION
SECTCODE	CHARACTER	3	0	SECTION CODE
VISITS	NUMERIC	4	0	NUMBER OF VISITS FOR SECTION CODE

APPENDIX B. DISPLAY SCREENS

LIST OF SCREENS

ABSENCE SCREEN FILE
APC SCREEN FILE
CHOICE SCREEN FILE
CMEALLOC SCREEN FILE
CMEREQ SCREEN FILE
CONFIRM SCREEN FILE
DELCMERE SCREEN FILE
DELLEAVE SCREEN FILE
DELMOEXP SCREEN FILE
DELQALLO SCREEN FILE
EQUIPMENT SCREEN FILE
EQUIPMENT UPDATE FROM RIR SCREEN FILE
MOEXP SCREEN FILE
OCCUPIED SCREEN FILE
PERRIR_B SCREEN FILE
PERSON SCREEN FILE
POSITION SCREEN FILE
QTRALLOC SCREEN FILE
SOCIAL SCREEN FILE
SURVEY SCREEN FILE
TDA SCREEN FILE
TDAINPUT SCREEN FILE
UPCMEREQ SCREEN FILE

ABSENCE SCREEN FILE

Update and change the absence information in the Personnel Database.

```
@  0, 21  SAY "UPDATE LEAVE OR ABSENCE REQUEST"
@  3,  4  SAY "This is the Fiscal Year"
@  3, 28  SAY  ABSENCE->FY  PICTURE "99"
@  3, 31  SAY "Leave or Absence request for ID CODE"
@  3, 68  SAY  ABSENCE->IDCODE  PICTURE "!9999"
@  6, 23  SAY "Type of Request"
@  6, 46  GET  ABSENCE->TYPE PICTURE "!"
@  8,  4  SAY "L..Regular Leave    E..Emergency Leave       T..Other TDY, not CME"
@  9,  4  SAY "P..Permissive TDY   C..Convalescent Leave    O..Other"
@ 13, 11  SAY "Starting Date"
@ 13, 26  GET  ABSENCE->START
@ 13, 38  SAY "Ending Date"
@ 13, 51  GET  ABSENCE->END
@ 15, 26  SAY "Duration"
@ 15, 35  SAY  ABSENCE->DURATION  PICTURE "999"
@ 15, 39  SAY "days"
@ 18, 13  SAY "COMMENT"
@ 18, 25  GET  ABSENCE->COMMENT  FUNCTION "!"
@  2,  1  TO  4, 75
@  7,  2  TO 10, 72
```

APC SCREEN FILE

Update and change the Account Processing Code information in the Budget Database.

```
@  2, 23  SAY "APC Code Entered ->"
@  2, 44  SAY  APC->APC  FUNCTION "R"  PICTURE "A-999"
@  5,  8  SAY "SECTION"
@  5, 20  GET  APC->SECTION
@  5, 48  SAY "Section Code"
@  5, 63  GET  APC->S_CODE
@  8, 20  SAY "Point of Contact"
@  8, 38  GET  APC->POC
@ 11, 20  SAY "Telephone Number"
@ 11, 38  GET  APC->TELEPHONE  PICTURE "(999)-999-9999"
@ 14, 31  SAY "Sec"
@ 15, 30  SAY "SECTION CODES"
```

```
@ 16,  4  SAY "Family Practice Clinic      FPC        Consolidated Troop Clinic    CTM"
@ 17,  4  SAY "General OutPatient Clinic   GOC        Fort Hunter Liggett Clinic   FHL"
@ 18,  4  SAY "CTMC-Family Practice        CFP        Ambulance Section            AMB"
@ 19,  4  SAY "Emergency Medical Service   EMS        Flight Surgeon Office        FSO"
@ 20,  4  SAY "Presidio of Monterey        POM        Department                   DEP"
@  1,  1  TO 13, 78    DOUBLE
@  3,  2  TO  3, 77
@ 14,  1  TO 21, 78
```

CHOICE SCREEN FILE

Generic user selection format for the Personnel Database.

```
@ 6,0 TO 11, 79 DOUBLE
@ 7,10 SAY "ENTER YOUR CHOICE"
@ 8,10 SAY "1. MOVE THE OLD PERSON TO EXCESS AND THE NEW PERSON INTO THE SLOT"
@ 9,10 SAY "2. PLACE THE PERSON YOU ARE WORKING WITH INTO THIS POSITION AS EXCESS ( OVERSTRENGTH,
POSITION CODE = 99)"
@ 10,10 SAY "3. TRY ANOTHER POSITION "
@ 7,28 GET ANSWER PICTURE "9" RANGE 1,3
```

CMEALLOC SCREEN FILE

Update and change the Continuing Medical Information funds allocation in Personnel Database.

```
@  1, 28  SAY "UPDATE CME ALLOCATION"
@  5,  9  SAY "THE CME ALLOCATION FOR FISCAL YEAR"
@  5, 44  SAY  CMEALLOC->FY
@  5, 47  SAY "SHOULD BE $"
@  5, 59  GET  CMEALLOC->ALLOCATION
@  3,  5  TO  7, 73    DOUBLE
```

CMEREQ SCREEN FILE

Update and change the CME request information in the Personnel Database.

```
@  1,  2  SAY "SUBJECT: APPLICATION FOR CONFERENCE/MISSION TRAVEL IN FISCAL YEAR"
@  1, 68  SAY  M_FY  PICTURE "99"
@  3,  0  SAY "1. Type of Travel Requested....."
@  3, 34  GET  CMEREQ->TYPE  PICTURE "!"
@  4,  3  SAY "C-Conference/Meeting Travel  G-General Mission Travel B-Board Certificatio"
@  6,  0  SAY "2. ID CODE of person requesting the travel is"
@  6, 46  SAY  M_IDCODE  PICTURE "!9999"
@  6, 52  SAY "."
@  8,  0  SAY "4. Purpose of Travel is"
@  8, 24  GET  CMEREQ->PURPOSE
@  8, 45  SAY ".   5. Registration Fee  $"
@  8, 71  GET  CMEREQ->REGFEE
@ 10,  0  SAY "6. Destination"
@ 10, 16  GET  CMEREQ->LOCATION
@ 10, 42  SAY "Mode of Travel is"
@ 10, 60  GET  CMEREQ->TVLMODE
@ 11, 42  SAY "F-FLY, G-GOVT VEH, P-POV, O-OTHER"
@ 13,  0  SAY "8. Leave Dates   Starting Date"
@ 13, 31  GET  CMEREQ->START
@ 13, 41  SAY "Ending Date"
@ 13, 53  GET  CMEREQ->END
@ 14,  3  SAY "Duration"
@ 14, 14  SAY  CMEREQ->DURATION
@ 14, 19  SAY "days"
@ 16,  0  SAY "13.  TRAVEL COST $"
@ 16, 18  GET  CMEREQ->TRAVELCOST
@ 16, 29  SAY "PER DIEM COST $"
@ 16, 44  GET  CMEREQ->PERDIEM
@ 16, 56  SAY "REIMBURSABLES $"
@ 16, 71  GET  CMEREQ->REIMB
@ 18, 17  SAY "TOTAL COST OF TRAVEL $"
@ 18, 40  SAY  CMEREQ->TOTALCOST
@ 20, 12  SAY "EXPENSES REFLECT THE"
IF C_CODE = "A"
   @ 20, 33  SAY "ACTUAL COST OF TRAVEL"
ELSE
   @ 20, 33  SAY "ESTIMATED COST OF TRAVEL"
```

```
ENDIF
@  0,  0  TO  2, 79
@ 19, 10  TO 21, 58
```

CONFIRM SCREEN FILE

Generic confirmation screen for the Personnel Database.

```
@ 4,0 SAY MESSAGE
@ 6,0 TO 9,79 DOUBLE
@ 7,5 SAY "Last Name: "+LNAME
@ 7,35 SAY "First Name: "+FNAME
@ 8,5 SAY "Rank: "+RANK
@ 8,35 SAY "Branch: "+BRANCH
?? CHR(7)
@ 15,0
WAIT "PRESS RETURN TO CONTINUE..."
```

DELCMERE SCREEN FILE

Special delete CME request information screen in Personnel Database.

```
@  1,  2  SAY "SUBJECT: DELETE APPLICATION FOR CONFERENCE/MISSION TRAVEL IN FISCAL YEAR"
@  1, 68  SAY  M_FY  PICTURE "99"
@  3,  0  SAY "1. Type of Travel Requested....."
@  3, 34  SAY  CMEREQ->TYPE  PICTURE "!"
@  4,  3  SAY "C-Conference/Meeting Travel  G-General Mission Travel B-Board Certificatio"
@  6,  0  SAY "2. ID CODE of person requesting the travel is"
@  6, 46  SAY  CMEREQ->IDCODE  PICTURE "!9999"
@  6, 52  SAY "."
@  8,  0  SAY "4. Purpose of Travel is"
@  8, 24  SAY  CMEREQ->PURPOSE
@  8, 45  SAY ".   5. Registration Fee  $"
@  8, 71  SAY  CMEREQ->REGFEE
@ 10,  0  SAY "6. Destination"
@ 10, 16  SAY  CMEREQ->LOCATION
@ 10, 42  SAY "Mode of Travel is"
@ 10, 60  SAY  CMEREQ->TVLMODE
@ 11, 42  SAY "F-FLY, G-GOVT VEH, P-POV, O-OTHER"
@ 13,  0  SAY "8. Leave Dates   Starting Date"
@ 13, 31  SAY  CMEREQ->START
@ 13, 41  SAY "Ending Date"
@ 13, 53  SAY  CMEREQ->END
@ 14,  3  SAY "Duration"
@ 14, 14  SAY  CMEREQ->DURATION
@ 14, 19  SAY "days"
@ 16,  0  SAY "13.  TRAVEL COST $"
@ 16, 18  SAY  CMEREQ->TRAVELCOST
@ 16, 29  SAY "PER DIEM COST $"
@ 16, 44  SAY  CMEREQ->PERDIEM
@ 16, 56  SAY "REIMBURSABLES $"
@ 16, 71  SAY  CMEREQ->REIMB
@ 18, 17  SAY "TOTAL COST OF TRAVEL $"
@ 18, 40  SAY TOTALCOST
@ 20, 17  SAY "DO YOU WANT TO DELETE THIS RECORD";
          GET  MAYBE PICTURE "!"
@  0,  0  TO  2, 79
@ 19, 10  TO 21, 58
```

DELLEAVE SCREEN FILE

Special delete Absence information screen for the Personnel Database.

```
@  0, 21  SAY "UPDATE LEAVE OR ABSENCE REQUEST"
@  3,  4  SAY "This is the Fiscal Year"
@  3, 28  SAY  ABSENCE->FY  PICTURE "99"
@  3, 31  SAY "Leave or Absence request for ID CODE"
@  3, 68  SAY  ABSENCE->IDCODE  PICTURE "!9999"
@  6, 23  SAY "Type of Request"
@  6, 46  SAY  ABSENCE->TYPE PICTURE "!"
```

```
@  8,  4  SAY "L..Regular Leave    E..Emergency Leave       T..Other TDY, not CME"
@  9,  4  SAY "P..Permissive TDY   C..Convalescent Leave    O..Other"
@ 13, 11  SAY "Starting Date"
@ 13, 26  SAY  ABSENCE->START
@ 13, 38  SAY "Ending Date"
@ 13, 51  SAY  ABSENCE->END
@ 15, 26  SAY "Duration"
@ 15, 35  SAY  ABSENCE->DURATION  PICTURE "999"
@ 15, 39  SAY "days"
@ 18, 13  SAY "COMMENT"
@ 18, 25  SAY  ABSENCE->COMMENT
@  2,  1  TO  4, 75
@  7,  2  TO 10, 72
@ 22, 17  SAY "DO YOU WANT TO DELETE THIS RECORD";
          GET  MAYBE PICTURE "!"
@ 21, 10  TO 23, 58
```

DELMOEXP SCREEN FILE

Special delete Monthly Expenditure format for the Budget Database.

```
@  2, 20  SAY "Delete this Monthly Expenditure"
@  5, 26  SAY "APC Code"
@  5, 38  SAY  MOEXP->APC  FUNCTION "!"  PICTURE "A###"
@  7, 26  SAY "Month"
@  7, 38  SAY  MOEXP->MONTH
@  9, 26  SAY "Expenses"
@  9, 38  SAY  MOEXP->EXPENSES
@  4, 15  TO 10, 56    DOUBLE
@ 18, 14 TO 20,59
@ 19, 19 SAY "Delete this Record? (Y/N) ";
         GET Maybe PICTURE "!"
```

DELQALLO SCREEN FILE

Special delete quarterly allocation format for the Budget Database.

```
@  3, 19  SAY "Delete the Quarterly Allocation"
@  4, 34  SAY "for"
@  5, 28  SAY "Fiscal Year"
@  5, 41  SAY  QTRALLOC->FY
@  9, 27  SAY "Quarter"
@  9, 39  SAY  QTRALLOC->QUARTER
@ 11, 27  SAY "APC Code"
@ 11, 39  SAY  QTRALLOC->APC
@ 13, 27  SAY "Allocation"
@ 13, 39  SAY  QTRALLOC->ALLOCATION
@  1, 14  TO 16, 59    DOUBLE
@  7, 15  TO  7, 58
@ 18, 14 TO 20,59
@ 19, 19 SAY "Delete this Record? (Y/N) ";
         GET Maybe PICTURE "!"
```

EQUIPMENT SCREEN FILE

Update and change the Equipment information in the Equipment Database.
[EMENU1_1 SCREEN FILE]

```
@  2, 17  SAY "E N T E R   N E W   E Q U I P M E N T   D A T A"
@  4, 25  SAY "EQUIPMENT CODE #"
@  4, 44  GET  EQUIP->EQCODE
@  6,  2  SAY "SECT   DATE      ITEM DESCRIPTION       TYPE   URGENCY    QTY     UNIT PRICE"
@  7,  2  GET  EQUIP->SECTCODE
@  7,  7  GET  EQUIP->REQDATE
@  7, 17  GET  EQUIP->DESCRIPT
@  7, 42  GET  EQUIP->REQTYPE
@  7, 52  GET  EQUIP->URGCODE
@  7, 60  GET  EQUIP->QTY
@  7, 67  SAY "$"
@  7, 69  GET  EQUIP->UNITPRICE
@  9, 21  SAY "STATUS CODE                COMMENTS"
@ 10, 26  GET  EQUIP->STATUS
```

```
@ 10, 41  GET  EQUIP->COMMENTS
@ 14,  7  SAY "URGENCY CODES          TYPE OF REQUEST CODES          STATUS CODES"
@ 16,  6  SAY "0    Needed Now            MEDC    MEDCASE             PW  Paperwork"
@ 17,  6  SAY "1    1 Year                CEEP    CEEP                RM  RMD"
@ 18,  6  SAY "2    2 Years               CAPR    CAPR                AP  Approved "
@ 19,  6  SAY "3    3 Years               OTHE    OTHER               OO  On Order"
@ 20,  6  SAY "4    Not Urgent                                        RC  Received"
@ 13,  4  TO 21, 22
@ 13, 28  TO 21, 52
@ 15, 29  TO 15, 51
@ 15,  5  TO 15, 21
@  1,  0  TO 11, 79    DOUBLE
@  3,  1  TO  3, 78
@ 13, 58  TO 21, 75
@ 15, 59  TO 15, 74
@  5, 24  TO  5, 51
```

EQUIPMENT UPDATE FROM RIR SCREEN FILE

Special update screen for Equipment when the Resource Information Report is used.
[EMENU2_2 SCREEN FILE]

```
@  3, 31  SAY "SECTION"
@  3, 42  SAY  EQUIP->SECTCODE
@  6,  9  SAY "EQUIP CODE    ITEM DESCRIPTION     QTY   UNITPRICE   STATUS"
@  7, 10  SAY  EQUIP->EQCODE
@  7, 21  SAY  EQUIP->DESCRIPT
@  7, 44  GET  EQUIP->QTY
@  7, 50  GET  EQUIP->UNITPRICE
@  7, 64  GET  EQUIP->STATUS
@ 10, 33  SAY "COMMENTS"
@ 11, 27  GET  EQUIP->COMMENTS
@ 14, 12  SAY "Press ESC to abort editing, ENTER to complete changes."
@  2,  5  TO 13, 71    DOUBLE
@  4,  6  TO  4, 70
```

MOEXP SCREEN FILE

Update and change the monthly expenditures in the Budget Database.

```
@  2, 22  SAY "Enter the Monthly Expenditure"
@  5, 26  SAY "APC Code"
@  5, 38  SAY  MOEXP->APC  FUNCTION "!"  PICTURE "A###"
@  7, 26  SAY "Month"
@  7, 38  SAY  MOEXP->MONTH
@  9, 26  SAY "Expenses"
@  9, 38  GET  MOEXP->EXPENSES
@  4, 15  TO 10, 56    DOUBLE
@ 21, 15  TO 24, 56
```

OCCUPIED SCREEN FILE

Special output screen when a TDA position is occupied in the Personnel Database.

```
@ 6,0 TO 11,79 DOUBLE
@ 7,5 SAY "THAT POSITION IS ALREADY OCCUPIED BY: "
@ 8,5 SAY "Last Name: "+LNAME
@ 9,5 SAY "First Name: "+FNAME
@ 10,5 SAY "Rank: "+RANK
@ 15,0
WAIT
```

PERRIR_B SCREEN FILE

Special input screen for personnel information when the Resource Information Report is Used.

```
@  1, 24  SAY "UPDATE FROM R.I.F. REPORT"
@  3,  0  SAY "B. CHANGES TO CURRENT TDA (OTHER THAN LOSSES OR GAINS)"
@  5, 22  SAY "OLD POSITION                                NEW POSITION"
@  7,  2  SAY "PARA   LINE   POSN  IDCODE   LAST NAME              RANK   PARA   LINE   POSN"
@  9,  3  GET  O_TDA_PARA PICTURE "999"
```

```
@  9, 10  GET  O_TDA_LINE PICTURE "99"
@  9, 17  GET  O_TDA_POSN PICTURE "99"
@  9, 23  GET  M_IDCODE PICTURE "!9999"
@  9, 31  GET  M_LNAME PICTURE "!!!!!!!!!!!!!!!!!!!"
@  9, 55  GET  M_RANK PICTURE "!!!"
@  9, 62  GET  M_TDA_PARA PICTURE "999"
@  9, 69  GET  M_TDA_LINE PICTURE "99"
@  9, 76  GET  M_TDA_POSN PICTURE "99"
@ 13, 18  SAY "PRESS RETURN (BLANK ALL ENTRIES) TO QUIT"
@  7,  7  TO  9,  7
@  7, 14  TO  9, 14
@  7, 21  TO  9, 21
@  7, 29  TO  9, 29
@  7, 52  TO  9, 52
@  7, 66  TO  9, 66
@  7, 73  TO  9, 73
@  5, 59  TO  9, 59    DOUBLE
@  4,  0  TO 10, 79    DOUBLE
@  6,  1  TO  6, 78
@  8,  1  TO  8, 78
@  0, 21  TO  2, 52
```

PERSON SCREEN FILE

Update and change personnel information in the Personnel Database.

```
@  0, 28  SAY "UPDATE PERSONNEL"
@  2,  4  SAY "ID CODE is"
@  2, 15  SAY  PERSON->IDCODE
@  4,  5  SAY "Last Name              First Name  MI      RANK   BRANCH     MOS"
@  5,  5  GET  PERSON->LNAME
@  5, 28  GET  PERSON->FNAME
@  5, 48  GET  PERSON->RANK
@  5, 56  GET  PERSON->BRANCH
@  5, 65  GET  PERSON->MOS
@  8,  5  SAY "Arrival Date......"
@  8, 23  GET  PERSON->ARRDATE
@  8, 38  SAY "Anticipated Date of Loss..."
@  8, 65  GET  PERSON->ALOSS
@ 12, 18  SAY "INDIVIDUAL IS ASSIGNED TO TDA POSITION"
@ 14, 23  SAY "TDA Paragraph Number is"
@ 14, 47  SAY  PERSON->TDA_PARA
@ 15, 23  SAY "TDA Line Number is"
@ 15, 42  SAY  PERSON->TDA_LINE
@ 16, 23  SAY "TDA Position Number is"
@ 16, 46  SAY  PERSON->TDA_POSN
@ 18,  6  SAY "NOTE: If Position Number is 99, the Individual is carried as excess"
@ 13, 16  TO 17, 57
@  6,  4  TO  6, 74
@  4, 53  TO  5, 53
@  4, 62  TO  5, 62
@  4, 45  TO  5, 45
@  4, 26  TO  5, 26
@  3,  3  TO 10, 75    DOUBLE
```

POSITION SCREEN FILE

TDA position verification output screen for the Personnel Database.

```
@ 12,0 TO 17,79 DOUBLE
@ 13,5 SAY "THE POSITION CHOSEN WAS: "
@ 14,5 SAY "Job Title: "+JOB_TITLE
@ 15,5 SAY "Authorized Branch: "+AUTH_BR
@ 15,30 SAY "Authorized Grade: "+AUTH_GR
@ 16,5 SAY "Authorized MOS: "+AUTH_MOS
@ 16,30 SAY "Authorized Position: "
IF AUTH = 1
        ?? "YES"
ELSE
        ?? "NO"
ENDIF
@ 22,0 WAIT
```

QTRALLOC SCREEN FILE

Update and change quarterly allocation in the Budget Database.

```
@  3, 19  SAY "Enter the New Quarterly Allocation"
@  4, 34  SAY "for"
@  5, 28  SAY "Fiscal Year"
@  5, 41  SAY  QTRALLOC->FY
@  9, 27  SAY "Quarter"
@  9, 39  SAY  QTRALLOC->QUARTER
@ 11, 27  SAY "APC Code"
@ 11, 39  SAY  QTRALLOC->APC
@ 13, 27  SAY "Allocation"
@ 13, 39  GET  QTRALLOC->ALLOCATION
@  1, 14  TO 16, 59    DOUBLE
@  7, 15  TO  7, 58
```

SOCIAL SCREEN FILE

Update and change personal information in the Personnel Database.

```
@  1, 12  SAY "This is the personal information for ID CODE"
@  1, 57  SAY  PRIVATE->IDCODE  PICTURE "!9999"
@  3, 28  SAY "PRIVACY ACT STATEMENT"
@  4,  0  SAY "PRINCIPLE PURPOSE: To maintain personal information on indivduals assigned to"
@  5,  3  SAY "this command to facilitate counseling, emergency notification, and social"
@  6,  3  SAY "event information."
@  8,  0  SAY "WARNING: This information is of a highly sensitive nature and should not be"
@  9,  3  SAY "provided to anyone outside of the chain of command without approval."
@ 11,  2  SAY "Address"
@ 11, 13  GET  PRIVATE->ADDRESS  FUNCTION "!"
@ 11, 38  SAY "Telephone"
@ 11, 50  GET  PRIVATE->TELEPHONE  FUNCTION "R"  PICTURE "(999)999-9999"
@ 13,  2  SAY "City, State, Zip Code"
@ 13, 25  GET  PRIVATE->CITY
@ 13, 45  SAY ","
@ 13, 47  GET  PRIVATE->STATE
@ 13, 51  GET  PRIVATE->ZIPCODE  FUNCTION "R"  PICTURE "99999-9999"
@ 15, 18  SAY "Date of Rank"
@ 15, 35  GET  PRIVATE->DOR
@ 17,  2  SAY "Wife's Name"
@ 17, 14  GET  PRIVATE->WIFE
@ 17, 29  SAY "Children's Names/Ages"
@ 17, 52  GET  PRIVATE->CHILDREN  FUNCTION "S24"
@ 19, 10  SAY "Comments"
@ 19, 27  GET  PRIVATE->COMMENTS
@  0,  0  TO  2, 77
@ 10,  0  TO 20, 77
```

SURVEY SCREEN FILE

Input screen for the Patient Satisfaction Survey in the Satisfaction Database.

```
@  1,  7  SAY "MONTH"
@  1, 13  GET  SURVEY->MONTH  RANGE 1, 12
@  1, 18  SAY "YEAR"
@  1, 23  GET  SURVEY->YEAR
@  1, 29  SAY "CLINIC"
@  1, 36  GET  SURVEY->SECTCODE
@  1, 43  SAY "DOCTOR"
@  1, 51  GET  SURVEY->DOCTORNAME
@  3, 18  SAY "1.A. Days to get appointment.     1.A."
@  3, 58  GET  SURVEY->APPTDAYS  RANGE 1, 6
@  4, 20  SAY "B. Acceptability.                 B."
@  4, 58  GET  SURVEY->ACCAPPT  RANGE 1, 2
@  6, 18  SAY "2.   Records ready on time.       2."
@  6, 58  GET  SURVEY->RECORDS  RANGE 1, 2
@  8, 18  SAY "3.A. Waiting time.                3.A."
@  8, 58  GET  SURVEY->WAITTIME  RANGE 1, 4
@  9, 20  SAY "B. Acceptability.                 B."
@  9, 58  GET  SURVEY->ACCWAIT  RANGE 1, 2
```

```
@ 11, 18  SAY "4.   Courtesy, receptionists.     4."
@ 11, 58  GET  SURVEY->RECEPT  RANGE 1, 5
@ 12, 18  SAY "5.   Courtesy, nurses.            5."
@ 12, 58  GET  SURVEY->NURSE  RANGE 1, 5
@ 13, 18  SAY "6.   Courtesy, doctors.           6."
@ 13, 58  GET  SURVEY->DOCTORS  RANGE 1, 5
@ 14, 18  SAY "7.   Explanation of procedures.   7."
@ 14, 58  GET  SURVEY->EXPLAIN  RANGE 1, 5
@ 15, 18  SAY "8.   Time spent with doctor.      8."
@ 15, 58  GET  SURVEY->TIMESPENT  RANGE 1, 5
@ 16, 18  SAY "9.   Cleanliness.                 9."
@ 16, 58  GET  SURVEY->CLEAN  RANGE 1, 5
@ 17, 17  SAY "10.   General satisfaction.       10."
@ 17, 58  GET  SURVEY->SATIS  RANGE 1, 5
@ 20, 20  SAY "ARE THERE COMMENTS TO ADD?  (Y/N)"
@ 20, 58  GET  SURVEY->PATCOMMENT
@ 21, 19  SAY "(Cntrl PgDn to Enter Comments)"
@ 21, 55  GET  SURVEY->COMMENTS
@  0,  4  TO 22, 73    DOUBLE
@  2, 15  TO 10, 60
@ 10, 15  TO 18, 60
```

TDA SCREEN FILE

Update and change the TDA information in the Personnel Database.

```
@  2, 15  SAY "TDA Listing"
@  4, 10  SAY "Paragraph Number"
@  4, 27  SAY  TDA->TDA_PARA
@  4, 54  SAY "POSITION TITLE"
@  6, 10  SAY "Line Number"
@  6, 28  SAY  TDA->TDA_LINE
@  6, 47  SAY "Job Title"
@  6, 59  GET  TDA->JOB_TITLE
@  8, 10  SAY "Position Number"
@  8, 28  SAY  TDA->TDA_POSN
@ 12, 26  SAY "POSITION CHARACTERISTICS"
@ 14, 24  SAY "APC Code"
@ 14, 46  GET  TDA->APC
@ 15, 24  SAY "Authorized Branch"
@ 15, 46  GET  TDA->AUTH_BR
@ 16, 24  SAY "Authorized Grade"
@ 16, 46  GET  TDA->AUTH_GR
@ 17, 24  SAY "Authorized MOS"
@ 17, 46  GET  TDA->AUTH_MOS
@ 18, 24  SAY "Position Authorized"
@ 18, 46  GET  TDA->AUTH
@ 19, 29  SAY "1=YES  0=NO"
@  3,  7  TO  9, 34
@  6, 35  TO  6, 44
@  5, 45  TO  7, 79
@ 13, 21  TO 20, 55
```

TDAINPUT SCREEN FILE

Input screen for entering a requested TDA position in the PErsonnel Database.

```
@ 6,0 TO 11,79 DOUBLE
@ 7,5 SAY "WHAT POSITION WILL THIS PERSON OCCUPY ;
OR ENTER A ZERO (0) TO QUIT: "
@ 8,5 SAY "TDA Paragraph Number:" ;
      GET M_TDAPARA PICTURE "999"
READ
*- SEE IF THEY WANT TO QUIT
IF M_TDAPARA = 0
   TRY=.F.
   LOOP
ENDIF
@ 9,5 SAY "TDA Line Number:" ;
        GET M_TDALINE PICTURE "99"
@ 10,5 SAY "TDA Position Number:" ;
        GET M_TDAPOSN PICTURE "99"
```

UPCMEREQ SCREEN FILE

Special update screen for CME requests when only actual costs are entered in Personnel Database.

```
@  1,  2  SAY "SUBJECT: APPLICATION FOR CONFERENCE/MISSION TRAVEL IN FISCAL YEAR"
@  1, 68  SAY  M_FY  PICTURE "99"
@  3,  0  SAY "1. Type of Travel Requested....."
@  3, 34  SAY  CMEREQ->TYPE  PICTURE "!"
@  4,  3  SAY "C-Conference/Meeting Travel  G-General Mission Travel B-Board Certificatio"
@  6,  0  SAY "2. ID CODE of person requesting the travel is"
@  6, 46  SAY  M_IDCODE  PICTURE "!9999"
@  6, 52  SAY "."
@  8,  0  SAY "4. Purpose of Travel is"
@  8, 24  SAY  CMEREQ->PURPOSE
@  8, 45  SAY ".   5. Registration Fee  $"
@  8, 71  GET  CMEREQ->REGFEE
@ 10,  0  SAY "6. Destination"
@ 10, 16  SAY  CMEREQ->LOCATION
@ 10, 42  SAY "Mode of Travel is"
@ 10, 60  SAY  CMEREQ->TVLMODE
@ 11, 42  SAY "F-FLY, G-GOVT VEH, P-POV, O-OTHER"
@ 13,  0  SAY "8. Leave Dates   Starting Date"
@ 13, 31  SAY  CMEREQ->START
@ 13, 41  SAY "Ending Date"
@ 13, 53  SAY  CMEREQ->END
@ 14,  3  SAY "Duration"
@ 14, 14  SAY  CMEREQ->DURATION
@ 14, 19  SAY "days"
@ 16,  0  SAY "13.  TRAVEL COST $"
@ 16, 18  GET  CMEREQ->TRAVELCOST
@ 16, 29  SAY "PER DIEM COST $"
@ 16, 44  GET  CMEREQ->PERDIEM
@ 16, 56  SAY "REIMBURSABLES $"
@ 16, 71  GET  CMEREQ->REIMB
@ 18, 17  SAY "TOTAL COST OF TRAVEL $"
@ 18, 40  SAY  CMEREQ->TOTALCOST
@ 20, 12  SAY "EXPENSES REFLECT THE "
IF C_CODE = "A"
    @ 20, 33  SAY "ACTUAL COST OF TRAVEL"
ELSE
    @ 20,33 SAY "ESTIMATED COST OF TRAVEL"
ENDIF
@  0,  0  TO  2, 79
@ 19, 10  TO 21, 58
```

APPENDIX C. BUDGET PROGRAMS

TABLE OF PROGRAMS

BMENU.PRG
BMENU1.PRG
BMENU2.PRG
BMENU3.PRG
BMENU4.PRG
BMENU4_1.PRG
BMENU4_2.PRG
BMENU4_3.PRG
BMENU4_4.PRG

DISCLAIMER

The purpose of this programming code is to facilitate the understanding of the requirements presented in Chapter 5 of this thesis. The nature of this project precludes it actual implementation in DBASE III+. To fully implement the requirements the system designer will need a full range of capabilities that does not currently exist in DBASE III+.

DBASE III+ served as the modeling tool by which the screens were generated and where necessary, specific code was written to illustrate a point. The actual working code merely acts as a shell in which to run the menus. A close analysis of the program code can facilitate implementation in a more suitable language, i.e., PARADOX, which can support the graphics and high level relationships involved in the various databases. Where the actual requirements process may appear to be unclear, comments were added within the code to explain these areas to the designer.

```
* Program..:
            BMENU.PRG

* Author...: ELBERT T. SHAW & JOAN ZIMMERMAN
* Date.....: 02/14/89
* Notice...: Copyright (c) 1989, ELBERT T. SHAW & JOAN
ZIMMERMAN, All Rights Reserved
* Notes....: The main engine menu for the Budget System
SET TALK OFF
SET BELL OFF
SET ESCAPE OFF
SET CONFIRM ON

DO WHILE .T.

   * ---Display menu options, centered on the screen.
   *    draw menu border and print heading
   CLEAR
   @ 2, 0 TO 14,79 DOUBLE
   @ 3, 18 SAY [DEPARTMENT OF FAMILY PRACTICE BUDGET SYSTEM]
  @ 4,1 TO 4,78 DOUBLE
   * ---display detail lines
   @  7,29 SAY [1. UPDATE FISCAL YEAR ALLOCATIONS]
   @  8,29 SAY [2. UPDATE MONTHLY EXPENDITURES]
   @  9,29 SAY [3. UPDATE APC INFORMATION FILE]
   @ 10,29 SAY [4. PRINT REPORTS]
   @ 12, 29 SAY '0. EXIT'
   STORE 0 TO selectnum
   @ 14,33 SAY " select      "
   @ 14,42 GET selectnum PICTURE "9" RANGE 0,4
   READ

   DO CASE
      CASE selectnum = 0
         CLEAR ALL
         RETURN

      CASE selectnum = 1
         *  DO UPDATE FY ALLOCATIONS
            DO BMENU1
            SET CONFIRM OFF
            WAIT
            SET CONFIRM ON

      CASE selectnum = 2
         *  DO UPDATE EXPENDITURES
            DO BMENU2
            SET CONFIRM OFF
            WAIT
            SET CONFIRM ON

      CASE selectnum = 3
         *  DO APC INFORMATION FILE
                              DO BMENU3
            SET CONFIRM OFF
            WAIT
            SET CONFIRM ON

      CASE selectnum = 4
         *  DO PRINT REPORTS
                              DO BMENU4
            SET CONFIRM OFF
            WAIT
            SET CONFIRM ON
ENDCASE

ENDDO T
RETURN
* EOF: BMENU.PRG
^Z
```

```
* Program..:
            BMENU1.PRG

* Author...: ELBERT T. SHAW & JOAN ZIMMERMAN
* Date.....: 02/14/89
* Notice...: Copyright (c) 1989, ELBERT T. SHAW & JOAN
ZIMMERMAN, All Rights Reserved *
Notes....:   Updates the Quarterly Allocation File
SET TALK OFF
SET BELL OFF
SET ESCAPE OFF
USE QTRALLOC
M_FY = 0

* Clear Screen for FY input an allow for the user to select
the Fiscal Year
* Typically, the user will only be operating in one FY

CLEAR
@6,0 to 8,79 DOUBLE
@7,15 SAY "Enter the Fiscal Year for the Allocations:" ;
      GET M_FY PICTURE "99"
READ
DO WHILE .T.

   * ---Display menu options, centered on the screen.
   *    draw menu border and print heading
   CLEAR
   @ 2, 0 TO 14,79 DOUBLE
   @ 3,6 SAY [U P D A T E  F I S C A L  Y E A R  A L L O C A
T I O N  S]
   @ 4,1 TO 4,78 DOUBLE
   * ---display detail lines
   @  7,25 SAY [1. ADD ALLOCATIONS FOR FY ]+STR(M_FY,2)
   @  8,25 SAY [2. CHANGE ALLOCATIONS FOR FY ]+STR(M_FY,2)
   @  9,25 SAY [3. REMOVE ALLOCATIONS FROM FY ]+STR(M_FY,2)
   @ 10,25 SAY [4. REVIEW ALLOCATIONS FOR FY ]+STR(M_FY,2)
   @ 12, 25 SAY '0. EXIT'
   STORE 0 TO selectnum
   @ 14,33 SAY " select      "
   @ 14,42 GET selectnum PICTURE "9" RANGE 0,4
   READ

   DO CASE
      CASE selectnum = 0
         SET BELL ON
         SET TALK ON
```

```
         CLOSE ALL
         CLEAR ALL
         RETURN

      CASE selectnum = 1
      *  DO ADD INFORMATION

         Adding = .T.
         DO WHILE Adding
            CLEAR
            M_APC = SPACE(4)

            *- Get the Section the User wants to work with
            @ 6,0 TO 10,79 DOUBLE
            @ 7,10 SAY "Enter the APC Number of Section to
enter its
                        allocation"  GET M_APC PICTURE
"!999"
            @ 8,10 SAY "or Press Return to QUIT"
            READ

            *-Nothing entered, so QUIT
            IF M_APC = "  "
               Adding = .F.
               LOOP
            ENDIF

            *-Make sure the APC exists in the Active File
            USE APC INDEX APC
            SEARCH= UPPER(M_APC)
            LOCATE FOR APC=SEARCH
            IF FOUND()
               CLEAR
               @ 6,0 TO 9,79 DOUBLE
               @ 7,5 SAY "Section: "+SECTION
               @ 7,35 SAY "Section Code: "+S_CODE
               @ 8,5 SAY "Point of Contact:"+POC
               @ 8,35 SAY ;

"Telephone:"+TRANSFORM(Telephone,"(999)999-9999")
            ELSE
               *-Warn User that APC entered does not exixt
               CLEAR
               @ 6,0 TO 8,79 DOUBLE
               @ 7,5 SAY "APC requested is not in the Master
File,;
                           Please Try again."
               ?? CHR(7)
               @ 15,0
               WAIT "Press Return to try again..."
               LOOP
            ENDIF

         *-Find out wish quarter's allocation the user wants
to add
         M_QTR = 0
         @ 14,0 TO 16,45
         @ 15,5 SAY "Enter the Quarter You Wish to Add: ";
               GET M_QTR PICTURE "9"
         READ
         USE QTRALLOC INDEX QTRALLOC

         *-Filter out all extraneous information and
restrict to user inputs
         SET FILTER TO FY=M_FY .AND. QUARTER=M_QTR
         GO TOP
         *-Check and see if the user has already enterd a
allocation for this
         *-APC and Quarter
         LOCATE FOR APC=M_APC
         IF FOUND()
            CLEAR
            WAIT "RECORD ALREADY EXISTS, Press Return to
Change it "
            *-If found, just Edit the existing record
            SET FORMAT TO QTRALLOC
            READ
            CLOSE FORMAT
         ELSE
            *-Create a new record
            SET FORMAT TO QTRALLOC
            CLEAR
            WAIT "ADDING NEW RECORD, Press Return to
Continue"
            APPEND BLANK
            *-What the user has input, don't make them
reinput it
            REPLACE FY WITH M_FY
            REPLACE APC WITH M_APC
            REPLACE QUARTER WITH M_QTR
            READ
            CLOSE FORMAT
         ENDIF

         ENDDO
         SET FILTER TO
         @ 5,0 SAY "Please stand by while I reindex the
file.."
         SET TALK ON
         REINDEX
         SET TALK OFF
         CLOSE ALL
         SET CONFIRM OFF
         WAIT
         SET CONFIRM ON

      CASE selectnum = 2
      *  DO CHANGE INFORMATION

         Adding = .T.
         DO WHILE Adding
            CLEAR
            M_APC = SPACE(4)
            @ 6,0 TO 10,79 DOUBLE
            @ 7,10 SAY "Enter the APC Number of Section to
update its
                        allocation" GET M_APC PICTURE "!999"

            @ 8,10 SAY "or Press Return to QUIT"
            READ

            IF M_APC = "  "
               Adding = .F.
               LOOP
            ENDIF

            USE APC INDEX APC
            SEARCH= UPPER(M_APC)
            *-Locate the APC and verify its existance
            LOCATE FOR APC=SEARCH
            IF FOUND()
               CLEAR
               @ 6,0 TO 9,79 DOUBLE
               @ 7,5 SAY "Section: "+SECTION
               @ 7,35 SAY "Section Code: "+S_CODE
               @ 8,5 SAY "Point of Contact:"+POC
               @ 8,35 SAY ;

"Telephone:"+TRANSFORM(Telephone,"(999)999-9999")
            ELSE
               CLEAR
               @ 6,0 TO 8,79 DOUBLE
               @ 7,5 SAY "APC requested is not in the Master
File,;
                           Please Try again."
               ?? CHR(7)
               @ 15,0
               WAIT "Press Return to try again..."
               LOOP
            ENDIF

         M_QTR = 0
         @ 14,0 TO 16,45
         @ 15,5 SAY "Enter the Quarter You Wish to Change:
";
               GET M_QTR PICTURE "9"
         READ
         USE QTRALLOC INDEX QTRALLOC
         *-Filter out all extraneous information and
restrict to user inputs
         SET FILTER TO FY=M_FY .AND. QUARTER=M_QTR
         GO TOP
         LOCATE FOR APC=M_APC
         IF FOUND()
            CLEAR
            WAIT "RECORD ALREADY EXISTS, Press Return to
Change it"                SET FORMAT TO QTRALLOC
            READ
            CLOSE FORMAT
         ELSE
            SET FORMAT TO QTRALLOC
            CLEAR
            WAIT "ADDING NEW RECORD, Press Return to
Continue"
            APPEND BLANK
            REPLACE FY WITH M_FY
            REPLACE APC WITH M_APC
            REPLACE QUARTER WITH M_QTR
            READ
            CLOSE FORMAT
         ENDIF

         ENDDO

         SET FILTER TO
         CLOSE ALL
         SET CONFIRM OFF
         WAIT
         SET CONFIRM ON

      CASE selectnum = 3
      *  DO REMOVE INFORMATION
```

```
         More = .T.
         DO WHILE More
            CLEAR
            M_APC = SPACE(4)
            @ 6,0 TO 10,79 DOUBLE
            @ 7,10 SAY "Enter the APC Number of the Section
to delete its
                  allocation" GET M_APC PICTURE "!999"
            @ 8,10 SAY "or Press Return to QUIT"
            READ

            IF M_APC = "  "
               More = .F.
               LOOP
            ENDIF

            USE APC INDEX APC
            SEARCH= UPPER(M_APC)
            LOCATE FOR APC=SEARCH
            IF FOUND()
               CLEAR
               @ 6,0 TO 9,79 DOUBLE
               @ 7,5 SAY "Section: "+SECTION
               @ 7,35 SAY "Section Code: "+S_CODE
               @ 8,5 SAY "Point of Contact:"+POC
               @ 8,35 SAY ;

"Telephone:"+TRANSFORM(Telephone,"(999)999-9999")
            ELSE
               CLEAR
               @ 6,0 TO 8,79 DOUBLE
               @ 7,5 SAY "APC requested is not in the Master
File, ;
                           Please Try again."
               ?? CHR(7)
               @ 15,0
               WAIT "Press Return to try again..."
               LOOP
            ENDIF

         M_QTR = 0
         @ 14,0 TO 16,45
         @ 15,5 SAY "Enter the Quarter You Wish to Delete:
";
                GET M_QTR PICTURE "9"
         READ
         USE QTRALLOC INDEX QTRALLOC
         SET FILTER TO FY=M_FY .AND. QUARTER=M_QTR
         GO TOP
         LOCATE FOR APC=M_APC
         IF FOUND()
            CLEAR
            Maybe = " "
            SET FORMAT TO DELQALLO
            READ
            CLOSE FORMAT
            IF UPPER(Maybe) = "Y"
               DELETE
            ENDIF
         ELSE
            @ 20,0 CLEAR
            ? "Can't find the requested record"
            ?? CHR(7)
            WAIT "Press any key to try again..."
            LOOP
         ENDIF
         ENDDO

         *-Give the user a chance to change their mind about
deleting data
         YorN = " "
         CLEAR
         @ 5,1 SAY "Permanently remove records marked for
deletion now?                    (Y/N)" GET YorN PICTURE
"!"
         @ 7,1 SAY "(Process may take a few minutes to
complete..)"
         READ
         IF YorN # "Y"
            SET FILTER TO
            @ 5,0 SAY "Please stand by while I reindex the
file.."
            SET TALK ON
            REINDEX
            SET TALK OFF
         ELSE
            SET FILTER TO
            Nodels = 0
            *--Count the number of records to be deleted
            ? "Counting... Please wait."
            COUNT FOR DELETED() TO Nodels

            Permiss = "N"
            DO WHILE Permiss = "N" .AND. Nodels > 0
              CLEAR
            *Display all deleted records
            ?
            DISPLAY APC, FY, QUARTER, ALLOCATION FOR
DELETED()
            ?
            Permiss = " "
            *-Give user all or some choice
            @ 23,5 SAY "OK to delete all these? (Y/N) ";
                 GET Permiss PICTURE "!"
            READ
            *--IF not OK to delete all, find out which
            IF Permiss # "Y"
               RecNo = 0
               @ 20,0 CLEAR
               *-Find Out which Records to recall
               @ 23,5 SAY "Recall which one (Record
Number): ";
                    GET RecNo PICTURE "999999"
               READ
               IF RecNo > 0 .AND. RecNo <= RECCOUNT()
                  GOTO RecNo
                  IF DELETED()
                     RECALL
                     Nodels = Nodels - 1
                  ENDIF
               ELSE
                  @ 20,0 CLEAR
                  @ 23,5 SAY "No such record:
"+STR(RecNO,4)
                  ? CHR(7)
                  WAIT
               ENDIF
            ENDIF
         ENDDO (Permiss and No-dels)
         SET TALK ON
         CLEAR
         @ 2,0 SAY ' '
         ? 'PACKING DATABASE TO REMOVE RECORDS MARKED FOR
          DELETION'
         PACK

         ENDIF
         SET TALK OFF
         SET CONFIRM OFF
         WAIT
         SET CONFIRM ON

      CASE selectnum = 4
      *  DO REVIEW INFORMATION
         CLEAR

         M_QTR = 0
         @ 6,0 TO 8,79 DOUBLE
         @ 7,15 SAY "Enter the Quarter to Review";
            GET M_QTR PICTURE "9" RANGE 1,4
         READ
         SET FILTER TO QUARTER=M_QTR .AND. FY=M_FY
         *Display only those records user desires
         GO TOP
         BROWSE NOAPPEND NOMENU
                  SET FILTER TO
         SET CONFIRM OFF
         WAIT
         SET CONFIRM ON
ENDCASE

ENDDO T
RETURN
* EOF: BMENU1.PRG
```

```
* Program..:
            BMENU2.PRG

* Author...: ELBERT T. SHAW & JOAN ZIMMERMAN
* Date.....: 02 14 89
* Notice...: Copyright (c) 1989, ELBERT T. SHAW & JOAN
ZIMMERMAN, All              Rights Reserved
* Notes....:
SET TALK OFF
SET BELL OFF
SET ESCAPE OFF
SET CONFIRM ON
USE MOEXP
CLEAR
M_FY = 0
@6,0 to 8,79 DOUBLE
@7,15 SAY "Enter the Fiscal Year for the Allocations:" ;
      GET M_FY PICTURE "99"
READ
```

```
DO WHILE .T.

   * ---Display menu options, centered on the screen.
   *    draw menu border and print heading
   CLEAR
   @ 2, 0 TO 14,79 DOUBLE
   @ 3,8 SAY [U P D A T E  M O N T H L Y   E X P E N D I T U
R E S]    @ 4,1 TO 4,78 DOUBLE
   * ---display detail lines
   @  7,25 SAY [1. ADD EXPENDITURES FOR FY ]+STR(M_FY,2)
   @  8,25 SAY [2. CHANGE EXPENDITURES FOR FY ]+STR(M_FY,2)
   @  9,25 SAY [3. REMOVE EXPENDITURES FROM FY ]+STR(M_FY,2)

   @ 10,25 SAY [4. REVIEW EXPENDITURES FOR FY ]+STR(M_FY,2)
   @ 12, 30 SAY '0. EXIT'
   STORE 0 TO selectnum
   @ 14,33 SAY " select      "
   @ 14,42 GET selectnum PICTURE "9" RANGE 0,4
   READ

   DO CASE
      CASE selectnum = 0
         CLEAR ALL
         CLOSE ALL
         RETURN

      CASE selectnum = 1
      *  DO ADD INFORMATION
         Adding = .T.
         DO WHILE Adding
            CLEAR
            M_APC = SPACE(4)
            @ 6,0 TO 10,79 DOUBLE
            @ 7,10 SAY "Enter the APC of the Section to
update
                           expenditures"  GET M_APC PICTURE
"!999"
            @ 8,10 SAY "or Press Return to QUIT"
            READ
            IF M_APC = "  "
               Adding = .F.
               LOOP
            ENDIF
            USE APC INDEX APC
            SEARCH= UPPER(M_APC)
            LOCATE FOR APC=SEARCH
            IF FOUND()
               CLEAR
               @ 6,0 TO 9,79 DOUBLE
               @ 7,5 SAY "Section: "+SECTION
               @ 7,35 SAY "Section Code: "+S_CODE
               @ 8,5 SAY "Point of Contact:"+POC
               @ 8,35 SAY;

"Telephone:"+TRANSFORM(Telephone,"(999)999-9999")
            ELSE
               CLEAR
               @ 6,0 TO 8,79 DOUBLE
               @ 7,5 SAY "APC requested is not in the Master
File, Please
                              Try again."
               ?? CHR(7)
               @ 15,0
               WAIT "Press Return to try again..."
               LOOP
            ENDIF

         M_MONTH = 0
         @ 14,0 TO 16,45
         @ 15,5 SAY "Enter the Month You Wish to Add: ";
                GET M_MONTH PICTURE "99" RANGE 1,12
         READ
         USE MOEXP INDEX MOEXP
         SET FILTER TO FY=M_FY .AND. MONTH=M_MONTH
         GO TOP
         LOCATE FOR APC=M_APC
         IF FOUND()
            CLEAR
            WAIT "RECORD ALREADY EXISTS, Press Return to
Change it "                SET FORMAT TO MOEXP
            READ
            CLOSE FORMAT
         ELSE
            SET FORMAT TO MOEXP
            CLEAR
            WAIT "ADDING NEW RECORD, Press Return to
Continue"
            APPEND BLANK
            REPLACE FY WITH M_FY
            REPLACE APC WITH M_APC
            REPLACE MONTH WITH M_MONTH
            *--Replace Quarter based on Month entered
            DO CASE
               CASE M_MONTH > 9
                     REPLACE QUAPTER WITH 1
               CASE M_MONTH > 6
                  REPLACE QUAPTER WITH 4

               CASE M_MONTH > 3
                     REPLACE QUARTER WITH 3

               CASE M_MONTH >= 1
                     REPLACE QUARTER WITH 2
            ENDCASE
            READ
            CLOSE FORMAT
         ENDIF

         ENDDO
         SET FILTER TO
         @ 5,0 SAY "Please stand by while I reindex the
file.."
         SET TALK ON
         REINDEX
         SET TALK OFF
         CLOSE ALL
         SET CONFIRM OFF
         WAIT
         SET CONFIRM ON

      CASE selectnum = 2
      *  DO CHANGE INFORMATION
         Adding = .T.
         DO WHILE Adding
            CLEAR
            M_APC = SPACE(4)
            @ 6,0 TO 10,79 DOUBLE
            @ 7,10 SAY "Enter the APC Number of the Section
to update its expenditures" GET M_APC PICTURE "!999"
            @ 8,10 SAY "or Press Return to QUIT"
            READ

            IF M_APC = "  "
               Adding = .F.
               LOOP
            ENDIF

            USE APC INDEX APC
            SEARCH= UPPER(M_APC)
            LOCATE FOR APC=SEARCH
            IF FOUND()
               CLEAR
               @ 6,0 TO 9,79 DOUBLE
               @ 7,5 SAY "Section: "+SECTION
               @ 7,35 SAY "Section Code: "+S_CODE
               @ 8,5 SAY "Point of Contact:"+POC
               @ 8,35 SAY ;

"Telephone:"+TRANSFORM(Telephone,"(999)999-9999")
            ELSE
               CLEAR
               @ 6,0 TO 8,79 DOUBLE
               @ 7,5 SAY "APC requested is not in the Master
File,; Please
                              Try again."
               ?? CHR(7)
               @ 15,0
               WAIT "Press Return to try again..."
               LOOP
            ENDIF

         M_MONTH = 0
         @ 14,0 TO 16,45
         @ 15,5 SAY "Enter the Month You Wish to Change: ";
                GET M_MONTH PICTURE "99" RANGE 1,12
         READ
         USE MOEXP INDEX MOEXP
         SET FILTER TO FY=M_FY .AND. MONTH=M_MONTH
         GO TOP
         LOCATE FOR APC=M_APC
         IF FOUND()
            CLEAR
            WAIT "RECORD ALREADY EXISTS, Press Return to
Change it"                 SET FORMAT TO MOEXP
            READ
            CLOSE FORMAT
         ELSE
            SET FORMAT TO MOEXP
            CLEAR
            WAIT "ADDING NEW RECORD, Press Return to
Continue"
            APPEND BLANK
            REPLACE FY WITH M_FY
            REPLACE APC WITH M_APC
            REPLACE MONTH WITH M_MONTH

            *--Automatically Replace Quarter based on Month
entered
            DO CASE
               CASE M_MONTH > 9
                     REPLACE QUAPTER WITH 1
```

```
            CASE M_MONTH > 6
               REPLACE QUARTER WITH 4

            CASE M_MONTH > 3
                 REPLACE QUARTER WITH 3

            CASE M_MONTH >= 1
                 REPLACE QUARTER WITH 2
         ENDCASE
         READ
         CLOSE FORMAT
      ENDIF

      ENDDO
      SET FILTER TO
      @ 5,0 SAY "Please stand by while I reindex the
file.."
      SET TALK ON
      REINDEX
      SET TALK OFF
      CLOSE ALL
      SET CONFIRM OFF
      WAIT
      SET CONFIRM ON

     CASE selectnum = 3
     *  DO REMOVE INFORMATION
        More = .T.
        DO WHILE More
           CLEAR
           M_APC = SPACE(4)
           @ 6,0 TO 10,79 DOUBLE
           @ 7,10 SAY "Enter the APC Number of the Section
to remove its
                        expenditures" GET M_APC PICTURE
"!999"
           @ 8,10 SAY "or Press Return to QUIT"
           READ

           IF M_APC = "  "
              More = .F.
              LOOP
           ENDIF

           USE APC INDEX APC
           SEARCH= UPPER(M_APC)
           LOCATE FOR APC=SEARCH
           IF FOUND()
              CLEAR
              @ 6,0 TO 9,79 DOUBLE
              @ 7,5 SAY "Section: "+SECTION
              @ 7,35 SAY "Section Code: "+S_CODE
              @ 8,5 SAY "Point of Contact:"+POC
              @ 8,35 SAY ;

"Telephone:"+TRANSFORM(Telephone,"(999)999-9999")
           ELSE
              CLEAR
              @ 6,0 TO 8,79 DOUBLE
              @ 7,5 SAY "APC requested is not in the Master
File, ;  Please
                        Try again."
              ?? CHR(7)
              @ 15,0
              WAIT "Press Return to try again..."
              LOOP
           ENDIF

        M_MONTH = 0
        @ 14,0 TO 16,45
        @ 15,5 SAY "Enter the MONTH You Wish to Delete: ";
              GET M_MONTH PICTURE "99" RANGE 1,12
        READ
        USE MOEXP INDEX MOEXP
        SET FILTER TO FY=M_FY .AND. MONTH=M_MONTH
        GO TOP
        LOCATE FOR APC=M_APC
        IF FOUND()
           CLEAR
           Maybe = " "
           SET FORMAT TO DELMOEXP
           READ
           CLOSE FORMAT
           IF UPPER(Maybe) = "Y"
              DELETE
           ENDIF
        ELSE
           @ 20,0 CLEAR
           ? "Can't find the requested record"
           ?? CHR(7)
           WAIT "Press any key to try again..."
           LOOP
        ENDIF

        ENDDO
```

```
        YorN = " "
        CLEAR
        @ 5,1 SAY "Permanently remove records marked for
deletion now?
                  (Y/N)";
              GET YorN PICTURE "!"
        @ 7,1 SAY "(Process may take a few minutes to
complete..)"
        READ
        IF YorN # "Y"
           SET FILTER TO
           @ 5,0 SAY "Please stand by while I reindex the
file.."
           SET TALK ON
           REINDEX
           SET TALK OFF
        ELSE
          SET FILTER TO
          Nodels = 0
          *--Count the number of records to be deleted
          ? "Counting... Please wait."
          COUNT FOR DELETED() TO Nodels
          Permiss = "N"
          DO WHILE Permiss = "N" .AND. Nodels > 0
             CLEAR
             ?
             DISPLAY APC, FY, MONTH, EXPENSES FOR DELETED()
             ?
             Permiss = " "
             @ 23,5 SAY "OK to delete all these? (Y/N) ";
                  GET Permiss PICTURE "!"
             READ
             *--If not OK to delete all, find out which
             IF Permiss # "Y"
                RecNo = 0
                @ 20,0 CLEAR
                @ 23,5 SAY "Recall which one (Record
Number): ";
                        GET RecNo PICTURE "999999"
                READ
                IF RecNo > 0 .AND. RecNo <= RECCOUNT()
                   GOTO RecNo
                   IF DELETED()
                      RECALL
                      Nodels = Nodels - 1
                   ENDIF
                ELSE
                   @ 20,0 CLEAR
                   @ 23,5 SAY "No such record:
"+STR(RecNO,4)
                   ? CHR(7)
                   WAIT
                ENDIF
             ENDIF
          ENDDO (Permiss and No-dels)
          SET TALK ON
          CLEAR
          @ 2,0 SAY ' '
          ? 'PACKING DATABASE TO REMOVE RECORDS MARKED FOR
             DELETION'
        PACK
        SET TALK OFF
        SET CONFIRM OFF
        WAIT
        SET CONFIRM ON

      CASE selectnum = 4
      *  DO REVIEW INFORMATION
         USE MOEXP INDEX MOEXP
         CLEAR

         M_MONTH = 0
         @ 6,0 TO 8,79 DOUBLE
         @ 7,15 SAY "Enter the Month to Review";
            GET M_MONTH PICTURE "99" RANGE 1,12
         READ
         *-Filter out extraneous information
         SET FILTER TO FY=M_FY .AND. MONTH=M_MONTH
         GO TOP
         BROWSE NOAPPEND NOMENU
         SET CONFIRM OFF
         WAIT
         SET CONFIRM ON
ENDCASE

ENDDO T
RETURN
* EOF: BMENU2.PRG
^Z
```

[redacted]

```
* Program..:
            BMENU3.PRG
```

```
* Author...: ELBERT T. SHAW & JOAN ZIMMERMAN
* Date.....: 02/14/89
* Notice...: Copyright (c) 1989, ELBERT T. SHAW & JOAN
ZIMMERMAN, All Rights Reserved
* Notes....:

USE APC INDEX APC
Ret = CHR(17)+CHR(196)+CHR(217)
DO WHILE .T.

   * ---Display menu options, centered on the screen.
   *    draw menu border and print heading
   M_APC=SPACE(4)
   CLEAR
   @ 2, 0 TO 14,79 DOUBLE
   @ 3,12 SAY [U P D A T E  A P C  I N F O R M A T I O N  F
I L E]
   @ 4,1 TO 4,78 DOUBLE
   * ---display detail lines
   @  7,30 SAY [1. ADD APC INFORMATION]
   @  8,30 SAY [2. CHANGE APC INFORMATION]
   @  9,30 SAY [3. REVIEW ALL APC INFORMATION]
   @ 16,22 SAY "[ APC is the Account Processing Code ]"
   @ 11, 30 SAY '0. EXIT'
   STORE 0 TO selectnum
   @ 14,33 SAY " select     "
   @ 14,42 GET selectnum PICTURE "9" RANGE 0,3
   READ

   DO CASE
      CASE selectnum = 0
         SET BELL ON
         SET TALK ON
         CLEAR ALL
         RETURN

      CASE selectnum = 1
      *  DO ADD INFORMATION
         Adding = .T.
         DO WHILE Adding
         *---Ask for new APC to add
            CLEAR
            CLOSE FORMAT
            M_APC = SPACE(4)
            @ 6,0 TO 8,79 DOUBLE
            @ 7,15 SAY "Enter APC Code -> ";
                GET M_APC PICTURE "!999"
            @ 15,15 SAY "Press Enter ["+Ret+"] to return to
Menu"
            READ

            *--Create lookup variable
            Search = UPPER(M_APC)

            *--If nothing entered, Leave Program
            IF Search = " "
               EXIT
            ENDIF

            *--See if APC is already Stored
            SEEK Search
            SET FORMAT TO APC
            *--If name Found Edit
            IF FOUND()
               CLEAR
               @ 6,0 TO 8,79 DOUBLE
               @ 7,15
               ?? "APC Code selected is already in use,
Please try again..."
               ?? CHR(7)
               @ 22,0
               WAIT
               LOOP
            ENDIF

            *--If not found, Add new APC
            IF .NOT. FOUND()
               APPEND BLANK
               REPLACE APC WITH M_APC
               READ
            ENDIF

         ENDDO
         @ 5,0 SAY "Please stand by while I reindex the
file.."
         SET TALK ON
         REINDEX
         SET TALK OFF
         LOOP
         CLOSE FORMAT

      CASE selectnum = 2
      *  DO CHANGE INFORMATION
                        CLEAR
         Adding = .T.
         DO WHILE Adding
            *---Ask for new APC to add
            CLEAR
            CLOSE FORMAT
            M_APC = SPACE(4)
            @ 6,0 TO 9,79 DOUBLE
            @ 7,15 SAY "Enter the APC Code you wish to
change :";
                    GET M_APC PICTURE "!999"
            @ 8,15 SAY "Press Enter ["+Ret+"] to return to
Menu"
            READ
            *--Create lookup variable
            Search = UPPER(M_APC)

            *--If nothing entered, Leave Program
            IF Search = " "
               Adding = .F.
               LOOP
            ENDIF

            *--See if APC is already Stored
            SEEK Search
            SET FORMAT TO APC

            *--If name Found Edit
            IF FOUND()
               M_APCSTATUS = " "
               CLEAR
               @ 6,0 TO 8,79 DOUBLE
               @ 7,15 SAY "Do You wish to put this APC Code
into inactive
                              status (Y/N):" GET M_APCSTATUS
PICTURE "!"
               READ
               *- IF WANT TO INACTIVATE APC, JUST PUT A
INACTIVE
                    CODE INTO FILE
               *  ELSE EDIT THE FILE AS USUAL.

               IF M_APCSTATUS = "Y"
                  REPLACE STATUS WITH I
               ELSE
                  SET FORMAT TO APC
                  READ
                  CLOSE FORMAT
               ENDIF
            ELSE
               *--If not found, warn user
               @ 6,0 TO 8,79 DOUBLE
               @ 7,15
                   ? "Can't Find the APC you requested:
",Search
                   ?? CHR(7)
                   WAIT
            ENDIF  (found)

         ENDDO
         CLEAR
         @ 5,0 SAY "Please stand by while I reindex the
file.."
         SET TALK ON
         REINDEX
         SET TALK OFF
         SET CONFIRM OFF
         WAIT
         SET CONFIRM ON

      CASE selectnum = 3
      *  DO REVIEW INFORMATION
                        SET HELP OFF
         GO TOP
         BROWSE NOAPPEND NOMENU
                    SET CONFIRM OFF
         WAIT
         SET CONFIPM ON

ENDCASE

LOOP

ENDDO
RETURN
* EOF: BMENU3.PRG
^Z
```

```
* Program..:
            BMENU4.PRG
```

```
* Author...: ELBERT T. SHAW & JOAN ZIMMERMAN
* Date.....: 02/14/89
* Notice...: Copyright (c) 1989, ELBERT T. SHAW & JOAN
ZIMMERMAN, ALL Rights Reserved
* Notes....:
* Reserved.: selectnum
*
SET TALK OFF
SET BELL OFF
SET ESCAPE OFF
SET CONFIRM ON

DO WHILE .T.

   * ---Display menu options, centered on the screen.
   *    draw menu border and print heading
   CLEAR
   @ 2, 0 TO 14,79 DOUBLE
   @ 3,28 SAY [P R I N T   R E P O R T S]
   @ 4,1 TO 4,78 DOUBLE
   * ---display detail lines
   @  7,33 SAY [1. MONTHLY REPORT]
   @  8,33 SAY [2. QUARTERLY REPORT]
   @  9,33 SAY [3. FISCAL YEAR REPORT (RECAP)]
   @ 10,33 SAY [4. PRINT GRAPHS]
   @ 12, 33 SAY '0. EXIT'
   STORE 0 TO selectnum
   @ 14,33 SAY " select     "
   @ 14,42 GET selectnum PICTURE "9" RANGE 0,4
   READ

   DO CASE
      CASE selectnum = 0
         CLEAR ALL
         RETURN

      CASE selectnum = 1
      *  DO MONTHLY REPORT
                        DO BMENU4_1
                                          SET CONFIRM OFF
         WAIT
         SET CONFIRM ON

      CASE selectnum = 2
      *  DO QUARTERLY REPORT
                       DO BMENU4_2
                                         SET CONFIRM OFF
         WAIT
         SET CONFIRM ON

      CASE selectnum = 3
      *  DO FY REPORT
                         DO BMENU4_3
                                            SET CONFIRM OFF

         WAIT
         SET CONFIRM ON

      CASE selectnum = 4
      *  DO PRINT GRAPHS
                        DO BMENU4_4
                                           SET CONFIRM OFF
         WAIT
         SET CONFIRM ON

ENDCASE

ENDDO T
RETURN
* EOF: BMENU4.PRG
^Z
```

```
* Program..:
            BMENU4_1.PRG

* Author...: ELBERT T. SHAW & JOAN ZIMMERMAN
* Date.....: 02/14/89
* Notice...: Copyright (c) 1989, ELBERT T. SHAW & JOAN
ZIMMERMAN, All Rights Reserved
* Notes....:
SET TALK OFF
SET BELL OFF
SET ESCAPE OFF
SET CONFIRM ON
M_FY = 0
M_MO = 0
CLEAR
@ 6, 0 TO 9,79 DOUBLE
@ 7,15 SAY "Enter the Fiscal Year for the report";
       GET M_FY PICTURE "99"
READ
@ 8,15 SAY "Enter the Month for the report";
       GET M_MO PICTURE "99" RANGE 1,12
READ

*** Restrict Output to selected FY and selected Month
*** MONTHLY REPORT PRINTED HERE ***

* EOF: BMENU4_1.PRG
^Z
```

```
* Program..:
            BMENU4_2.PRG

* Author...: ELBERT T. SHAW & JOAN ZIMMERMAN
* Date.....: 02/14/89
* Notice...: Copyright (c) 1989, ELBERT T. SHAW & JOAN
ZIMMERMAN, All Rights Reserved
* Notes....:
SET TALK OFF
SET BELL OFF
SET ESCAPE OFF
SET CONFIRM ON
M_FY = 0
M_QTR = 0
CLEAR
@ 6, 0 TO 9,79 DOUBLE
@ 7,15 SAY "Enter the Fiscal Year for the report";
       GET M_FY PICTURE "99"
READ
@ 8,15 SAY "Enter the Quarter for the report";
       GET M_QTR PICTURE "9" RANGE 1,4
READ

*** QUARTERLY REPORT PRINTED HERE ***

* EOF: BMENU4_1.PRG
^Z
```

```
* Program..:
            BMENU4_3.PRG

* Author...: ELBERT T. SHAW & JOAN ZIMMERMAN
* Date.....: 02/14/89
* Notice...: Copyright (c) 1989, ELBERT T. SHAW & JOAN
ZIMMERMAN, All Rights Reserved
* Notes....:
SET TALK OFF
SET BELL OFF
SET ESCAPE OFF
SET CONFIRM ON
M_FY = 0
* CLEAR THE SCREEN TO ACCEPT THE FY INPUT
* DETERMINE THE FY OF THE REPORT
CLEAR
@ 6,0 TO 8,79 DOUBLE
@ 7,15 SAY "Enter the Fiscal Year for the reports";
       GET M_FY PICTURE "99"
READ
DO WHILE .T.
   * ---Display menu options, centered on the screen.
   *    draw menu border and print heading
   CLEAR
   @ 2, 0 TO 12,79 DOUBLE
   @ 3,8 SAY [F I S C A L   Y E A R   R E P O R T S]
   @ 4,1 TO 4,78 DOUBLE
   * ---display detail lines
   @  7,33 SAY [1. FISCAL YEAR ALLOCATION REPORT]
   @  8,33 SAY [2. FISCAL YEAR RECAP]
   @ 10, 33 SAY '0. EXIT'
   STORE 0 TO selectnum
   @ 12,33 SAY " select     "
   @ 12,42 GET selectnum PICTURE "9" RANGE 0,2
   READ

   DO CASE
      CASE selectnum = 0
         SET BELL ON
         SET TALK ON
         CLEAR ALL
         RETURN

      CASE selectnum = 1
      *  DO ALLOCATION

            *** FY ALLOCATION REPORT PRINTED HERE
***                 SET CONFIRM OFF
         WAIT
```

```
        SET CONFIRM ON

      CASE selectnum = 2
      *  DO EXPENDITURES

           *** FY RECAP REPORT PRINTED HERE ***
                  SET CONFIRM OFF
        WAIT
        SET CONFIRM ON
ENDCASE

ENDDO T
RETURN
* EOF: BMENU4_3.PRG
^Z
```

[redacted]

```
* Program..:
            BMENU4_4.PRG

* Author...: ELBERT T. SHAW & JOAN ZIMMERMAN
* Date.....: 02/14/89
* Notice...: Copyright (c) 1989, ELBERT T. SHAW & JOAN
ZIMMERMAN, All Rights Reserved
* Notes....:
SET TALK OFF
SET BELL OFF
SET ESCAPE OFF
SET CONFIRM ON
M_FY = 0
M_QTR = 0
M_RANGE = 0
DO WHILE .T.

   * ---Display menu options, centered on the screen.
   *    draw menu border and print heading
   CLEAR
   @ 2, 0 TO 12,79 DOUBLE
   @ 3,29 SAY [P R I N T   G R A P H S]
   @ 4,1 TO 4,78 DOUBLE
   * ---display detail lines
   @  7,24 SAY [1. PERCENT SPENT FOR QUARTER (BAR GRAPH)]
   @  8,24 SAY [2. TREND GRAPHS (LINE GRAPH)]
   @ 10, 24 SAY '0. EXIT'
   STORE 0 TO selectnum
   @ 12,33 SAY " select     "
   @ 12,42 GET selectnum PICTURE "9" RANGE 0,3
   READ

   DO CASE
      CASE selectnum = 0
         SET BELL ON
         SET TALK ON
         CLEAR ALL
         RETURN

      CASE selectnum = 1
      *  DO PERCENT SPENT FOR QTR (BAR GRAPH)

         * Clear Screen for FY and QTR input
         CLEAR
         @6,0 to 9,79 DOUBLE
         @7,15 SAY "Enter the Fiscal Year of the
Expenditure:";
             GET M_FY PICTURE "99"
         READ
         @ 8,15 SAY "Enter the Quarter to Review";
            GET M_QTR PICTURE "9" RANGE 1,4
         READ

         *** DETERMINE EXPENDITURE BY SECTION FOR EACH

             SECTION FOR THE QUARTER SELECTED, HIS FIGURE
             COULD  BE A PARTIAL OUTLOOK FOR THE CURRENT
             QUARTER COMPARE TO CURRENT SECTION'S ALLOCATION
             AND DETERMINE PERCENTAGE SPENT

         *** PERCENT SPENT FOR QUARTER GRAPH HERE

         SET CONFIRM OFF
         WAIT

         READ
         SET CONFIRM ON

      CASE selectnum = 2
      *  DO TREND (LINE GRAPH)

         M_FY = 0
         * Clear Screen for FY input
         CLEAR
         @6,0 to 8,79 DOUBLE
         @7,15 SAY "Enter the Fiscal Year of the Report:";
             GET M_FY PICTURE "99"
         READ

         *** TOTAL ALL SECTION EXPENDITURES BY MONTH TO
             DETERMINE PERCENTAGE *** EXPENDITURES FOR EACH
           MONTH OF FY. ALSO GRAPH TOTAL ALLOCATION FOR
         *** DEPARTMENT FOR EACH QUARTER.
           *** PRINT YEARLY TREND LINE GRAPH HERE
***

         *  DO LONG TERM TREND (TREND GRAPH)
         *** LOCATE ALL DATA FOR CURRENT FISCAL YEAR, AND
                PREVIOUS FISCAL YEARS UP TO THE TWO YEARS
             FROM CURRENT YEAR
         *** TREND ON MONTHS EXPENDITURES, DISPLAY
             ALLOCATIONS FOR THOSE YEARS
         *** INDIVIDUAL APC EXPENDITURES ARE TOTALED TO GET
A
             DEPARTMENT WIDE PICTURE
         *** PRINT LONG TERM TREND GRAPH HERE ***

         SET CONFIRM OFF
         WAIT
         SET CONFIRM ON
ENDCASE

ENDDO T
RETURN
* EOF: BMENU5.PRG
^Z
```

APPENDIX D. EQUIPMENT PROGRAMS

TABLE OF PROGRAMS

EMENU.PRG
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EMENU1_3.PRG
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EM3_4_1.PRG
EMENU3_5.PRG
EMENU4.PRG

DISCLAIMER

The purpose of this programming code is to facilitate the understanding of the requirements presented in Chapter 5 of this thesis. The nature of this project precludes it actual implementation in DBASE III+. To fully implement the requirements the system designer will need a full range of capabilities that does not currently exist in DBASE III+.

DBASE III+ served as the modeling tool by which the screens were generated and where necessary, specific code was written to illustrate a point. The actual working code merely acts as a shell in which to run the menus. A close analysis of the program code can facilitate implementation in a more suitable language, i.e., PARADOX, which can support the graphics and high level relationships involved in the various databases. Where the actual requirements process may appear to be unclear, comments were added within the code to explain these areas to the designer.

```
* Program..:
            EMENU.PRG

* Author...: ELBERT T. SHAW & JOAN ZIMMERMAN
* Date.....: 02/16/89
* Notice...: Copyright (c) 1989, All Rights Reserved
* Notes....:
SET TALK OFF
SET BELL OFF
SET STATUS OFF
SET ESCAPE OFF
SET CONFIRM ON

DO WHILE .T.

   * ---Display menu options, centered on the screen.
   *    draw menu border and print heading
   CLEAR
   @ 2, 0 TO 14,79 DOUBLE
   @ 3,13 SAY [DEPARTMENT OF FAMILY PRACTICE PLANNED
EQUIPMENT SYSTEM]
   @ 4,1 TO 4,78 DOUBLE
   * ---display detail lines
   @  7,27 SAY [1. UPDATE EQUIPMENT LISTING]
   @  8,27 SAY [2. UPDATE PRIORITIES]
   @  9,27 SAY [3. PRINT REPORTS]
   @ 10,27 SAY [4. ARCHIVE HISTORICAL DATA]
   @ 12, 27 SAY '0. EXIT'
   STORE 0 TO selectnum
   @ 14,33 SAY " select     "
   @ 14,42 GET selectnum PICTURE "9" RANGE 0,4
   READ

   DO CASE
      CASE selectnum = 0
         SET BELL ON
         SET TALK ON
         CLEAR ALL
         RETURN

      CASE selectnum = 1
      *  DO UPDATE EQUIPMENT LISTING

         DO EMENU1

         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET
wait_subst
         READ
         SET CONFIRM ON

      CASE selectnum = 2
      *  DO UPDATE PRIORITIES

         DO EMENU2

         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET
wait_subst
         READ
         SET CONFIRM ON

      CASE selectnum = 3
      *  DO PRINT REPORTS

         DO EMENU3

         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET
wait_subst
         READ
         SET CONFIRM ON

      CASE selectnum = 4
      *  DO ARCHIVE HISTORICAL DATA

         DO EMENU4

         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET
wait_subst
         READ
         SET CONFIRM ON
ENDCASE

ENDDO T
RETURN
* EOF: EMENU.PRG
^Z
```

```
* Program..:
            EMENU1.PRG

* Author...: JOAN ZIMMERMAN & ELBERT SHAW
* Date.....: 02/16/89
* Notice...: Copyright (c) 1989, JOAN ZIMMERMAN & ELBERT
SHAW, All Rights Reserved

SET TALK OFF
SET BELL OFF
SET STATUS OFF
SET ESCAPE OFF
SET CONFIRM ON
USE EQUIP

DO WHILE .T.
```

```
   * ---Display menu options, centered on the screen.
   *    draw menu border and print heading
   CLEAR
   @ 2, 0 TO 14,79 DOUBLE
   @ 3,17 SAY [U P D A T E   P R O C U R E M E N T   L I S T
I N G]
   @ 4,1 TO 4,78 DOUBLE
   * ---display detail lines
   @  7,30 SAY [1. ADD EQUIPMENT INFORMATION]
   @  8,30 SAY [2. CHANGE EQUIPMENT DATA]
   @  9,30 SAY [3. REMOVE EQUIPMENT ENTRY]
   @ 10,30 SAY [4. REVIEW EQUIPMENT LIST]
   @ 12, 30 SAY '0. EXIT'
   STORE 0 TO selectnum
   @ 14,33 SAY " select      "
   @ 14,42 GET selectnum PICTURE "9" RANGE 0,4
   READ

   DO CASE
      CASE selectnum = 0
         RETURN

      CASE selectnum = 1
      *  DO ADD INFORMATION

         SET CONFIRM OFF
         SET FORMAT TO EMENU1_1
         APPEND BLANK
         *THIS COMPUTES THE EXTENDED PRICE
         REPLACE EXTPRICE WITH QTY * UNITPRICE
         CLOSE FORMAT
         *VERIFY THAT THE CODE NUMBER GIVEN IS NOT A
DUPLICATE
         *IF IT IS, NOTIFY USER AND ALLOW THEM TO CHANGE THE
         *NUMBER WITHOUT REEDITING THE COMPLETE INFORMATION
         *THEN REPLACE THE OLD CODE NUMBER WITH THE NEW
NUMBER
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET
wait_subst
         READ
         SET CONFIPM ON

      CASE selectnum = 2
      *  DO CHANGE INFORMATION

         DO EMENU1_2


         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET
wait_subst
         READ
         SET CONFIRM ON

      CASE selectnum = 3
      *  DO REMOVE INFORMATION

         DO EMENU1_3
         SET TALK OFF
         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET
wait_subst
         READ
         SET CONFIRM ON

      CASE selectnum = 4
      *  DO REVIEW INFORMATION
         M_SECT = "   "
         CLEAR
         @ 6,0 TO 8,79 DOUBLE
         @ 7,15 SAY "Enter the section code of the section
to review";
                GET M_SECT PICTURE "XXX"
         READ
         SET HELP OFF
         SET FILTER TO SECTCODE=M_SECT
         GO TOP
         BROWSE NOAPPEND NOMENU
         SET FILTEF TO
         CLEAR MEMORY
         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET
wait_subst
         READ
         SET CONFIRM ON
ENDCASE

ENDDO T
RETURN
* EOF: EMENU1.PRG
^Z
```

[redacted]

```
* Program..:
            EMENU1_2.PRG

* Author...: JOAN ZIMMERMAN & ELBERT SHAW
* Date.....: 02/16/89
* Notice...: Copyright (c) 1989, JOAN ZIMMERMAN & ELBERT
SHAW, All Rights Reserved
SET TALK OFF
SET BELL OFF
SET STATUS OFF
SET ESCAPE OFF
SET CONFIRM ON
USE EQUIP
DO WHILE .T.

   * ---Display menu options, centered on the screen.
   *    draw menu border and print heading
   CLEAR
   @ 2, 0 TO 12,79 DOUBLE
   @ 3,23 SAY [C H A N G E   P R O C U R E M E N T   D A T A]

   @ 4,1 TO 4,78 DOUBLE
   * ---display detail lines
   @  7,27 SAY [1. BY EQUIPMENT CODE NUMBER]
   @  8,27 SAY [2. BY SECTION CODE]
   @ 10, 27 SAY '0. EXIT'
   STORE 0 TO selectnum
   @ 12,33 SAY " select      "
   @ 12,42 GET selectnum PICTURE "9" RANGE 0,2
   READ

   DO CASE
      CASE selectnum = 0
         RETURN

      CASE selectnum = 1
      *  DO BY EQUIPMENT CODE NUMBER

         CLEAR
         M_EQ = 0.0
         @6,0 TO 8,79 DOUBLE
         @ 7,15 SAY "Enter the Equipment Code Number:";
               GET M_EQ PICTURE "9999.99"
         READ
         IF M_EQ = 0.0
            LOOP
         ENDIF
         GO TOP
         LOCATE FOR EQCODE=M_EQ
         SET FORMAT TO EMENU1_1
         READ
         CLOSE FORMAT
         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET
wait_subst
         READ
         SET CONFIRM ON

      CASE selectnum = 2
      *  DO BY SECTION CODE

         CLEAR
         M_SECT = "   "
         @6,0 TO 8,79 DOUBLE
         @7,15 SAY "Enter the Section Code for section
needing changes:";
               GET M_SECT PICTURE "AAA"
         READ
         IF M_SECT = "   "
            LOOP
         ENDIF
         RECORD = "      "
         GO TOP
         CLEAR
         LIST ALL EQCODE,SECTCODE,REQDATE,DESCRIPT,REQTYPE;

               FOR SECTCODE=M_SECT
         @21,10 SAY "Enter the Record Number of the record;

          to change:" GET RECORD
         READ
         GOTO &RECORD
         SET FORMAT TO EMENU1_1
         READ
         CLOSE FORMAT
         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET
wait_subst
```

```
         READ
         SET CONFIRM ON
ENDCASE

ENDDO T
RETURN
* EOF: EMENU1_2.PRG
^Z
```

```
* Program..:
              EMENU1_3.PRG

* Author...: JOAN ZIMMERMAN & ELBERT SHAW
* Date.....: 02/16/89
* Notice...: Copyright (c) 1989, JOAN ZIMMERMAN & ELBERT
SHAW, All Rights
SET TALK OFF
SET BELL OFF
SET STATUS OFF
SET ESCAPE OFF
SET CONFIRM ON
USE EQUIP
STILLATIT = .T.
DO WHILE STILLATIT

   * ---Display menu options, centered on the screen.
   *    draw menu border and print heading
   CLEAR
   @ 2, 0 TO 12,79 DOUBLE
   @ 3,17 SAY [R E M O V E   P R O C U R E M E N T   E N T R
Y]
   @ 4,1 TO 4,78 DOUBLE
   * ---display detail lines
   @  7,27 SAY [1. BY EQUIPMENT CODE NUMBER]
   @  8,27 SAY [2. BY SECTION CODE]
   @ 10, 27 SAY '0. EXIT'
   STORE 0 TO selectnum
   @ 12,33 SAY " select      "
   @ 12,42 GET selectnum PICTURE "9" RANGE 0,2
   READ

   DO CASE
      CASE selectnum = 0
         RETURN

      CASE selectnum = 1
      *  DO BY EQUIPMENT CODE NUMBER

         ANSWER = " "
         CLEAR
         M_EQ = 0.0
         @6,0 TO 8,79 DOUBLE
         @ 7,15 SAY "Enter the Equipment Code Number:";
               GET M_EQ PICTURE "9999.99"
         READ
         ** If no number return to menu **
         IF M_EQ = 0.0
              STILLATIT = .F.
              LOOP
         ENDIF
         ** Look for equipment code **
         LOCATE FOR EQCODE=M_EQ
         CLEAR
         DISPLAY EQCODE,SECTCODE,REQDATE,DESCRIPT,REQTYPE
         ?
         WAIT "REMOVE THIS RECORD? (Y/N)" TO ANSWER
         IF UPPER(ANSWER) = "Y"
             DELETE RECORD RECNO()
         ENDIF
         SET TALK ON
         @7,15
         RECALL ALL
         WAIT "This is where the pack would go"
         SET TALK OFF
         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET
wait_subst

         READ
         SET CONFIRM ON

      CASE selectnum = 2
      *  DO BY SECTION CODE

         ANSWER = " "
         CLEAR
         M_SECT = "    "
         @6,0 TO 8,79 DOUBLE
         @7,15 SAY "Enter the Section Code for deletions:";

             GET M_SECT PICTURE "@!AAA"

         READ
         RECORD = "       "
         GO TOP
         clear
         LIST ALL EQCODE,SECTCODE,REQDATE,DESCRIPT,REQTYPE

                FOR SECTCODE=M_SECT
         @21,10 SAY "Enter the Record Number of the record;

          to remove:" GET RECORD
         READ
         GOTO &RECORD
         CLEAR
         DISPLAY EQCODE,SECTCODE,REQDATE,DESCRIPT,REQTYPE
         ?
         WAIT "REMOVE THIS RECORD? (Y/N)" TO ANSWER
         IF UPPER(ANSWER) = "Y"
            DELETE RECORD RECNO()
         ENDIF
         SET TALK ON
         @ 7,15
         RECALL ALL
         WAIT "This is where the pack would go "
         SET TALK OFF
         READ
         CLOSE FORMAT
         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET
wait_subst

         READ
         SET CONFIRM ON
ENDCASE

ENDDO T
RETURN
* EOF: EMENU1_2.PRG
^Z
```

```
* Program..:
              EMENU2.PRG

* Author...: JOAN ZIMMERMAN & ELBERT SHAW
* Date.....: 02/17/89
* Notice...: Copyright (c) 1989, JOAN ZIMMERMAN & ELBERT
SHAW, All Rights Reserved
SET TALK OFF
SET BELL OFF
SET STATUS OFF
SET ESCAPE OFF
SET CONFIRM ON
USE EQUIP
DO WHILE .T.

   * ---Display menu options, centered on the screen.
   *    draw menu border and print heading
   CLEAR
   @ 2, 0 TO 12,79 DOUBLE
   @ 3,17 SAY [U P D A T E   P R I O R I T I E S / S T A T U
S]
   @ 4,1 TO 4,78 DOUBLE
   * ---display detail lines
   @  7,32 SAY [1. UPDATE PRIORITIES]
   @  8,32 SAY [2. UPDATE STATUS]
   @ 10, 32 SAY '0. EXIT'
   STORE 0 TO selectnum
   @ 12,33 SAY " select      "
   @ 12,42 GET selectnum PICTURE "9" RANGE 0,2
   READ

   DO CASE
      CASE selectnum = 0
         RETURN

      CASE selectnum = 1
      *  DO UPDATE PRIORITIES

         DO EMENU2_1

         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET
wait_subst
         READ
         SET CONFIRM ON

      CASE selectnum = 2
      *  DO UPDATE STATUS

         DO EMENU2_2
```

```
         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET
wait_subst
         READ
         SET CONFIRM ON
ENDCASE

ENDDO T
RETURN
* EOF: EMENU2.PRG
^Z
```

```
* Program..:
            EMENU2_1.PRG

* Author...: JOAN ZIMMERMAN & ELBERT SHAW
* Date.....: 02/16/89
* Notice...: Copyright (c) 1989, JOAN ZIMMERMAN & ELBERT
SHAW, All Rights Reserved
SET TALK OFF
SET BELL OFF
SET STATUS OFF
SET ESCAPE OFF
SET CONFIRM ON
USE EQUIP
DO WHILE .T.

   * ---Display menu options, centered on the screen.
   *    draw menu border and print heading
   CLEAR
   @ 2, 0 TO 14,79 DOUBLE
   @ 3,24 SAY [U P D A T E   P R I O R I T I E S]
   @ 4,1 TO 4,78 DOUBLE
   * ---display detail lines
   @  7,31 SAY [1. MEDCASE EQUIPMENT]
   @  8,31 SAY [2. CEEP EQUIPMENT]
   @  9,31 SAY [3. CAPR EQUIPMENT]
   @ 10,31 SAY [4. OTHER EQUIPMENT]
   @ 12, 31 SAY '0. EXIT'
   STORE 0 TO selectnum
   @ 14,33 SAY " select     "
   @ 14,42 GET selectnum PICTURE "9" RANGE 0,4
   READ

   DO CASE
      CASE selectnum = 0
         RETURN

      CASE selectnum = 1
      *  DO MEDCASE EQUIPMENT
         CLEAR
         SET FILTER TO REQTYPE="MEDC"
         GO TOP

         BROWSE FIELDS
        EQCODE,REQTYPE,SECTCODE,DESCRIPT,URGCODE,PRIORITY,

            QTY,UNITPRICE
         SET FILTER TO
         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET
wait_subst
         READ
         SET CONFIRM ON

      CASE selectnum = 2
      *  DO CEEP EQUIPMENT

         CLEAR
         SET FILTER TO REQTYPE="CEEP"
         GO TOP
         BROWSE FIELDS
        EQCODE,REQTYPE,SECTCODE,DESCRIPT,URGCODE,
           PRIORITY,QTY,UNITPRICE
         SET FILTER TO

         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET
wait_subst
         READ
         SET CONFIRM ON

      CASE selectnum = 3
      *  DO CAPR EQUIPMENT

         CLEAR
         SET FILTER TO REQTYPE="CAPR"
         GO TOP
         BROWSE FIELDS
        EQCODE,REQTYPE,SECTCODE,DESCRIPT,URGCODE,
           PRIORITY,QTY,UNITPRICE
         SET FILTER TO

         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET
wait_subst
         READ
         SET CONFIRM ON

      CASE selectnum = 4
      *  DO OTHER EQUIPMENT

         CLEAR
         SET FILTER TO REQTYPE="OTHE"
         GO TOP
         BROWSE FIELDS
        EQCODE,REQTYPE,SECTCODE,DESCRIPT,URGCODE,
           PRIORITY,QTY,UNITPRICE
         SET FILTER TO

         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET
wait_subst
         READ
         SET CONFIRM ON
ENDCASE

ENDDO T
RETURN
* EOF: EMENU2.PRG
^Z
```

```
* Program..:
            EMENU2_2.PRG

* Author...: JOAN ZIMMERMAN & ELBERT SHAW
* Date.....: 02/17/89
* Notice...: Copyright (c) 1989, JOAN ZIMMERMAN & ELBERT
SHAW, All Rights reserved
SET TALK OFF
SET BELL OFF
SET STATUS OFF
SET ESCAPE OFF
SET CONFIRM ON
USE EQUIP

DO WHILE .T.

   * ---Display menu options, centered on the screen.
   *    draw menu border and print heading
   CLEAR
   @ 2, 0 TO 12,79 DOUBLE
   @ 3,28 SAY [U P D A T E   S T A T U S]
   @ 4,1 TO 4,78 DOUBLE
   * ---display detail lines
   @  7,31 SAY [1. BY EQUIPMENT CODE]
   @  8,31 SAY [2. BY SECTION CODE]
   @ 10, 31 SAY '0. EXIT'
   STORE 0 TO selectnum
   @ 12,33 SAY " select     "
   @ 12,42 GET selectnum PICTURE "9" RANGE 0,2
   READ

   DO CASE
      CASE selectnum = 0
         RETURN

      CASE selectnum = 1
     *  DO BY EQUIPMENT CODE

         CLEAR
         M_EQ = 0.0
         @6,0 TO 8,79 DOUBLE
         @ 7,15 SAY "Enter the Equipment Code Number:";
               GET M_EQ PICTURE "9999.99"
         READ
         IF M_EQ = 0.0
            LOOP
         ENDIF
         GO TOP
         LOCATE FOR EQCODE=M_EQ
         SET FORMAT TO EMENU2_2
         READ
         CLOSE FORMAT
         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET
wait_subst
         READ
```

```
        SET CONFIRM ON

      CASE selectnum = 2
      *  DO BY SECTION CODE

         CLEAR
         M_SECT = "   "
         @6,0 TO 8,79 DOUBLE
         @7,15 SAY "Enter the Section Code for STATUS
updates:";
               GET M_SECT PICTURE "AAA"
         READ
         IF M_SECT = "   "
            LOOP
         ENDIF
         RECORD = "       "
         GO TOP
         CLEAR
         LIST ALL
EQCODE,SECTCODE,REQDATE,DESCRIPT,REQTYPE,STATUS;
            FOR SECTCODE=M_SECT
         @21,10 SAY "Enter the Record Number for STATUS
updates:";
                GET RECORD
         READ
         GOTO &RECORD
         SET FORMAT TO EMENU2_2
         READ
         CLOSE FORMAT

         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET
wait_subst
         READ
         SET CONFIRM ON
ENDCASE

ENDDO T
RETURN
* EOF: EMENU2_2.PRG
^Z
```

```
* Program..:
            EMENU3.PRG

* Author...: JOAN ZIMMERMAN & ELBERT SHAW
* Date.....: 02/16/89
* Notice...: Copyright (c) 1989, JOAN ZIMMERMAN & ELBERT
SHAW, All Rights Reserved
SET TALK OFF
SET BELL OFF
SET STATUS OFF
SET ESCAPE OFF
SET CONFIRM ON

DO WHILE .T.

   * ---Display menu options, centered on the screen.
   *    draw menu border and print heading
   CLEAR
   @ 2, 0 TO 15,79 DOUBLE
   @ 3,28 SAY [P R I N T   R E P O R T S]
   @ 4,1 TO 4,78 DOUBLE
   * ---display detail lines
   @  7,27 SAY [1. DEPARTMENT REPORTS]
   @  8,27 SAY [2. EQUIPMENT TYPE REPORTS]
   @  9,27 SAY [3. PRIORITY WORKSHEETS]
   @ 10,27 SAY [4. HISTORICAL FILE REPORTS]
   @ 11,27 SAY [5. EXPORT FILES TO SPREADSHEET]
   @ 13, 27 SAY '0. EXIT'
   STORE 0 TO selectnum
   @ 15,33 SAY " select     "
   @ 15,42 GET selectnum PICTURE "9" RANGE 0,5
   READ

   DO CASE
      CASE selectnum = 0
         RETURN

      CASE selectnum = 1
      *  DO DEPARTMENT REPORTS

         DO EMENU3_1

         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET
wait_subst
         READ
         SET CONFIRM ON

      CASE selectnum = 2
      *  DO CATEGORY/STATUS REPORTS
         DO EMENU3_2
         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET
wait_subst
         READ
         SET CONFIRM ON

      CASE selectnum = 3
      *  DO PRIORITY WORKSHEET REPORT

         DO EMENU3_3
         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET
wait_subst
         READ
         SET CONFIRM ON

      CASE selectnum = 4
      *  DO HISTORICAL FILE REPORTS
         DO EMENU3_4

         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET
wait_subst
         READ
         SET CONFIRM ON

      CASE selectnum = 5
      *  DO EXPORT TO FILE
                                 DO EMENU3_5

         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET
wait_subst
         READ
         SET CONFIRM ON
ENDCASE

ENDDO T
RETURN
* EOF: EMENU3.PRG
^Z
```

```
* Program..:
            EMENU3_1.PRG

* Author...: JOAN ZIMMERMAN & ELBERT SHAW
* Date.....: 02/17/89
* Notice...: Copyright (c) 1989, JOAN ZIMMERMAN & ELBERT
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SET TALK OFF
SET BELL OFF
SET STATUS OFF
SET ESCAPE OFF
SET CONFIRM ON
USE EQUIP

DO WHILE .T.

   * ---Display menu options, centered on the screen.
   *    draw menu border and print heading
   CLEAR
   @ 2, 0 TO 13,79 DOUBLE
   @ 3,23 SAY [D E P A R T M E N T   R E P O R T S]
   @ 4,1 TO 4,78 DOUBLE
   * ---display detail lines
   @  7,32 SAY [1. BY COST]
   @  8,32 SAY [2. BY URGENCY]
   @  9,32 SAY [3. BY STATUS CODE]
   @ 11, 32 SAY '0. EXIT'
   STORE 0 TO selectnum
   @ 13,33 SAY " select     "
   @ 13,42 GET selectnum PICTURE "9" RANGE 0,3
   READ

   DO CASE
      CASE selectnum = 0
         RETURN

      CASE selectnum = 1
      *  DO BY COST


       ***** Set index to cost sort and Print report here
*****
```

```
         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET
wait_subst
         READ
         SET CONFIRM ON

      CASE selectnum = 2
      *  DO BY URGENCY


           **** Set index to urgency sort, print report
here *****

         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET
wait_subst
         READ
         SET CONFIRM ON

      CASE selectnum = 3
      *  DO BY STATUS CODE

       ***** Set index to status code sort, print report
here *****

         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET
wait_subst
         READ
         SET CONFIRM ON
ENDCASE

ENDDO T
RETURN
* EOF: EMENU3_1.PRG
^Z
```

```
* Program..:
              EMENU3_2.PRG

* Author...: JOAN ZIMMERMAN & ELBERT SHAW
* Date.....: 02/17/89
* Notice...: Copyright (c) 1989, JOAN ZIMMERMAN & ELBERT
SHAW, All Rights
* Reserved
SET TALK OFF
SET BELL OFF
SET STATUS OFF
SET ESCAPE OFF
SET CONFIRM ON
USE EQUIP

DO WHILE .T.

   * ---Display menu options, centered on the screen.
   *    draw menu border and print heading
   CLEAR
   @ 2, 0 TO 14,79 DOUBLE
   @ 3,15 SAY [P R O C U R E M E N T   T Y P E   R E P O R
T S]
   @ 4,1 TO 4,78 DOUBLE
   * ---display detail lines
   @  7,32 SAY [1. MEDCASE EQUIPMENT]
   @  8,32 SAY [2. CEEP EQUIPMENT]
   @  9,32 SAY [3. CAPR EQUIPMENT]
   @ 10,32 SAY [4. OTHER]
   @ 12, 32 SAY '0. EXIT'
   STORE 0 TO selectnum
   @ 14,33 SAY " select     "
   @ 14,42 GET selectnum PICTURE "9" RANGE 0,4
   READ

   DO CASE
      CASE selectnum = 0
         RETURN

      CASE selectnum = 1
      *  DO MEDCASE EQUIPMENT


      *  Call Sorting program, sort by priority or cost *

         DO EM3_2_1

      *****  Print MEDCASE Equipment report here *****

         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET
wait_subst

         READ
         SET CONFIRM ON

      CASE selectnum = 2
      *  DO CEEP EQUIPMENT


      *  Call Sorting program, sort by priority or cost *
         DO EM3_2_1

      *****  Print CEEP Equipment report here *****

         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET
wait_subst

         READ
         SET CONFIRM ON

      CASE selectnum = 3
      *  DO CAPR EQUIPMENT

      *  Call Sorting program, sort by priority or cost *
         DO EM3_2_1

      *****  Print CAPR Equipment report here *****

         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET
wait_subst

         READ
         SET CONFIRM ON

      CASE selectnum = 4
      *  DO OTHER


      *  Call Sorting program, sort by priority or cost *
         DO EM3_2_1

      *****  Print OTHER Equipment report here *****

         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET
wait_subst

         READ
         SET CONFIRM ON
ENDCASE

ENDDO T
RETURN
* EOF: EMENU3_2.PRG
^Z
```

```
* Program..:
              EM3_2_1.PRG

* Author...: JOAN ZIMMERMAN & ELBERT SHAW
* Date.....: 02/17/89
* Notice...: Copyright (c) 1989, JOAN ZIMMERMAN & ELBERT
SHAW, All Rights Reserved
SET TALK OFF
SET BELL OFF
SET STATUS OFF
SET ESCAPE OFF
SET CONFIRM ON

DO WHILE .T.

   * ---Display menu options, centered on the screen.
   *    draw menu border and print heading
   CLEAR
   @ 2, 0 TO 12,79 DOUBLE
   @ 3,15 SAY [C H O O S E   D E S I R E D   S O R T   O P T
I O N]
   @ 4,1 TO 4,78 DOUBLE
   * ---display detail lines
   @  7,33 SAY [1. SORT BY PRIORITY]
   @  8,33 SAY [2. SORT BY COST]
   @ 10, 33 SAY '0. EXIT'
   STORE 0 TO selectnum
   @ 12,33 SAY " select     "
```

```
   @ 12,42 GET selectnum PICTURE "9" RANGE 0,2
   READ

   DO CASE
      CASE selectnum = 0
         RETURN

      CASE selectnum = 1
      *  DO SORT BY PRIORITY

      ******  Set indexes here to sort by priority *****


         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET
wait_subst
         READ
         RETURN

      CASE selectnum = 2
      *  DO SORT BY COST


      *****  Set indexes here to sort by cost *****


         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET
wait_subst
         READ
         RETURN
ENDCASE

ENDDO T
RETURN
* EOF: EM3_2_1.PRG
^Z
```

```
* Program..:
            EMENU3_3.PRG

* Author...: JOAN ZIMMERMAN & ELBERT SHAW
* Date.....: 02/17/89
* Notice...: Copyright (c) 1989, JOAN ZIMMERMAN & ELBERT
SHAW, All Rights Reserved
SET TALK OFF
SET BELL OFF
SET STATUS OFF
SET ESCAPE OFF
SET CONFIRM ON
USE EQUIP

***** Set cost sort, highest to lowest *****
DO WHILE .T.

   * ---Display menu options, centered on the screen.
   *    draw menu border and print heading
   CLEAR
   @ 2, 0 TO 14,79 DOUBLE
   @ 3,17 SAY [P R I O R I T Y   W O R K S H E E T   F O R M
S]
   @ 4,1 TO 4,78 DOUBLE
   * ---display detail lines
   @  7,29 SAY [1. MEDCASE PRIORITY FORM]
   @  8,29 SAY [2. CEEP PRIORITY FORM]
   @  9,29 SAY [3. CAPR PRIORITY FORM]
   @ 10,29 SAY [4. OTHER PRIORITY FORM]
   @ 12, 29 SAY '0. EXIT'
   STORE 0 TO selectnum
   @ 14,33 SAY " select     "
   @ 14,42 GET selectnum PICTURE "9" RANGE 0,4
   READ

   DO CASE
      CASE selectnum = 0
         RETURN

      CASE selectnum = 1
      *  DO MEDCASE PRIORITY FORM

      *  REPORT FORM EM3_3 FOR REQTYPE=MEDC TO PRINT


         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET
wait_subst
         READ
         SET CONFIRM ON

      CASE selectnum = 2
      *  DO CEEP PRIORITY FORM

      *  REPORT FORM EM3_3 ALL FOR REQTYPE=CEEP TO PRINT


         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET
wait_subst
         READ
         SET CONFIRM ON

      CASE selectnum = 3
      *  DO CAPR PRIORITY FORM

      *  REPORT FORM EM3_3 ALL FOR REQTYPE=CAPR TO PRINT

         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET
wait_subst
         READ
         SET CONFIRM ON

      CASE selectnum = 4
      *  DO OTHER PRIORITY FORM

      *  REPORT FORM EM3_3 ALL FOR REQTYPE=OTHE TO PRINT

         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET
wait_subst
         READ
         SET CONFIRM ON
ENDCASE

ENDDO T
RETURN
* EOF: EMENU3_3.PRG
^Z
```

```
* Program..:
            EMENU3_4.PRG

* Author...: JOAN ZIMMERMAN & ELBERT SHAW
* Date.....: 02/17/89
* Notice...: Copyright (c) 1989, JOAN ZIMMERMAN & ELBERT
SHAW, All Rights Reserved
SET TALK OFF
SET BELL OFF
SET STATUS OFF
SET ESCAPE OFF
SET CONFIRM ON
USE EQHIST

DO WHILE .T.

   * ---Display menu options, centered on the screen.
   *    draw menu border and print heading
   CLEAR
   @ 2, 0 TO 12,79 DOUBLE
   @ 3,23 SAY [H I S T O R I C A L   R E P O R T S]
   @ 4,1 TO 4,78 DOUBLE
   * ---display detail lines
   @  7,27 SAY [1. PRINT HISTORICAL DATA REPOPTS]
   @  8,27 SAY [2. PRINT HISTORICAL SUMMARY]
   @ 10, 27 SAY '0. EXIT'
   STORE 0 TO selectnum
   @ 12,33 SAY " select     "
   @ 12,42 GET selectnum PICTURE "9" RANGE 0,2
   READ

   DO CASE
      CASE selectnum = 0
         RETURN

      CASE selectnum = 1
      *  DO PRINT ALL HISTORICAL DATA
         DO EM3_4_1

         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET
wait_subst
         READ
         SET CONFIPM ON

      CASE selectnum = 2
```

```
      *  DO PRINT HISTORICAL SUMMARY

      *  THE HISTORICAL SUMMARY ROUTINE TAKES THE HISTOPICAL
         FILE
      *  AND COMPUTES THE FOLLOWING INFORMATION
      *  THE TOTAL NUMBER OF REQUESTS BY TYPE
      *      THE AVERAGE COST PER TYPE
      *      THE AVERAGE TIME TO COMPLETE THE ACTION BASED
ON       THE
      *       DURATION INFORMATION COMPUTED UPON ARCHIVING
      *  THE NUMBER OF REQUESTS BY SECTION, THEN TYPE
      *  THE AVERAGE COST BY SECTION, THEN TYPE

      *  PRINT HISTORICAL SUMMARY REPORT HERE

         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET
wait_subst
         READ
         SET CONFIRM ON
ENDCASE

ENDDO T
RETURN
* EOF: EMENU3_4.PRG
^Z
```

```
* Program..:
            EM3_4_1.PRG

* Author...: JOAN ZIMMERMAN & ELBERT SHAW
* Date.....: 02/17/89
* Notice...: Copyright (c) 1989, JOAN ZIMMERMAN & ELBERT
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SET TALK OFF
SET BELL OFF
SET STATUS OFF
SET ESCAPE OFF
SET CONFIRM ON

* Get desired earliest month of report
CLEAR
M_DATE = "     "
@6,0 TO 8,79 DOUBLE
@ 7,10 SAY "Enter the earliest Month and Year for historical
report:";
       GET M_DATE PICTURE "XX/XX"
READ
IF M_DATE = " "
    LOOP
ENDIF
DO WHILE .T.

   * ---Display menu options, centered on the screen.
   *    draw menu border and print heading
   CLEAR
   @ 2, 0 TO 13,79 DOUBLE
   @ 3,23 SAY [H I S T O R I C A L   R E P O R T S]
   @ 4,1 TO 4,78 DOUBLE
   * ---display detail lines
   @  7,33 SAY [1. BY SECTION]
   @  8,33 SAY [2. BY EQUIPMENT TYPE]
   @ 11, 33 SAY '0. EXIT'
   STORE 0 TO selectnum
   @ 13,33 SAY " select     "
   @ 13,42 GET selectnum PICTURE "9" RANGE 0,2
   READ

   DO CASE
      CASE selectnum = 0
         RETURN

      CASE selectnum = 1
      *  DO BY SECTION

      *****  Set indexes here for sections *****


      *****  Print Historical report by Section here *****

         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET
wait_subst

         READ
         SET CONFIRM ON

      CASE selectnum = 2
      *  DO BY CATEGORY

      *****  Set indexes here for Equipment type *****

      *****  Print Historical report by Equipment Type here
*****

         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET
wait_subst

         READ
         SET CONFIRM ON
ENDCASE

ENDDO T
RETURN
* EOF: EM3_4_1.PRG
^Z
```

```
* Program..:
            EMENU3_5.PRG

* Author...: JOAN ZIMMERMAN & ELBERT SHAW
* Date.....: 02/17/89
* Notice...: Copyright (c) 1989, JOAN ZIMMERMAN & ELBERT
SHAW, All Rights Reserved
SET TALK OFF
SET BELL OFF
SET STATUS OFF
SET ESCAPE OFF
SET CONFIRM ON

DO WHILE .T.

   * ---Display menu options, centered on the screen.
   *    draw menu border and print heading
   CLEAR
   @ 2, 0 TO 12,79 DOUBLE
   @ 3,14 SAY [E X P O R T   F I L E S   T O   S P R E A D S
H E E T]
   @ 4,1 TO 4,78 DOUBLE
   * ---display detail lines
   @  7,26 SAY [1. EXPORT CURRENT DATABASE]
   @  8,26 SAY [2. EXPORT HISTORICAL DATABASE]
   @ 10, 26 SAY '0. EXIT'
   STORE 0 TO selectnum
   @ 12,33 SAY " select     "
   @ 12,42 GET selectnum PICTURE "9" RANGE 0,2
   READ

   DO CASE
      CASE selectnum = 0
         RETURN

      CASE selectnum = 1
      *  DO EXPORT CURRENT DATABASE

         USE EQUIP

        *****  Write CURRENT DATABASE export program here
*****

         CLOSE ALL

         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET
wait_subst
         READ
         SET CONFIRM ON

      CASE selectnum = 2
      *  DO EXPORT HISTORICAL DATABASE

         USE EQHIST

        *****  Write HISTORICAL DATABASE export program
here *****

         CLOSE ALL

         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET
wait_subst
         READ
         SET CONFIRM ON
ENDCASE

ENDDO T
RETURN
```

```
* EOF: EMENU3_5.PRG
^Z
```

```
* Program..:
            EMENU4.PRG

* Author...: JOAN ZIMMERMAN & ELBERT SHAW
* Date.....: 02/16/89
* Notice...: Copyright (c) 1989, JOAN ZIMMERMAN & ELBERT
SHAW, All Rights Reserved
* Notes....:

*

SET TALK OFF
SET BELL OFF
SET STATUS OFF
SET ESCAPE OFF
SET CONFIRM ON


   * ---Display menu options, centered on the screen.
   *    draw menu border and print heading
   CLEAR
   ANSWER = " "
   @ 4, 0 TO 16,79 DOUBLE
   @ 5,15 SAY [A R C H I V E   T O   H I S T O R I C A L   F
I L E]
   @ 6,1 TO 6,78 DOUBLE
   @ 8,15 SAY "CAUTION:  All files with a received status,
RC, will be"
   @ 9,25 SAY "removed from the equipment listing"
   @ 10,25 SAY "to the historical file."
   @ 14,25 SAY "Do you wish to continue the archive? (Y/N)";

            GET ANSWER PICTURE "!A"
   READ
   IF ANSWER # "Y"
      RETURN
   ELSE
      @ 18,15 SAY "**** Program to Archive File ****"
      * THE PROGRAM SEARCHES THE ACTIVE FILE FOR STATUS
CODES        = RC
      * IF FOUND IT TRANSFERS THE NECESSARY FIELDS TO THE
        HISTORICAL
      * FILE AND COMPUTES THE DURATION IN DAYS BETWEEN THE
        REQUEST
      * DATE AND CURRENT SYSTEM DATE. THE SYSTEM DATE IS
ALSO          INSERTED
      * INTO THE HISTORICAL DATABASE RECORD ALON WITH THE
        COMPUTED
      * DURATION.
   ENDIF
   WAIT "Press any key to continue ..."
   SET STATUS ON
   SET TALK ON
   CLEAR ALL
   RETURN


RETURN
* EOF: EMENU4.PRG
```

APPENDIX E. PERSONNEL PROGRAMS

TABLE OF PROGRAMS

PMENU.PRG
PMENU1.PRG
PMENU2.PRG
PMENU3.PRG
PMENU4.PRG
PMENU4_1.PRG
PMENU4_2.PRG
PMENU4_3.PRG
PMENU4_4.PRG
PMENU5.PRG
PMENU6.PRG

DISCLAIMER

The purpose of this programming code is to facilitate the understanding of the requirements presented in Chapter 5 of this thesis. The nature of this project precludes it actual implementation in DBASE III+. To fully implement the requirements the system designer will need a full range of capabilities that does not currently exist in DBASE III+.

DBASE III+ served as the modeling tool by which the screens were generated and where necessary, specific code was written to illustrate a point. The actual working code merely acts as a shell in which to run the menus. A close analysis of the program code can facilitate implementation in a more suitable language, i.e., PARADOX, which can support the graphics and high level relationships involved in the various databases. Where the actual requirements process may appear to be unclear, comments were added within the code to explain these areas to the designer.

```
* Program:
          PMENU.PRG
* Author.: ELBERT T. SHAW & JOAN ZIMMERMAN
* Date...: 02/02/89
* Notice.: Copyright(c)1989, E. T. SHAW & JOAN ZIMMERMAN,All
Rights Reserved * Notes....:Main Menu for the Personnel
System
SET TALK OFF
SET BELL OFF
SET ESCAPE OFF
SET CONFIRM ON

DO WHILE .T.

   * ---Display menu options, centered on the screen.
   *    draw menu border and print heading
   CLEAR
   @ 2, 0 TO 16,79 DOUBLE
   @ 3,15 SAY [DEPARTMENT OF FAMILY PRACTICE PERSONNEL
SYSTEM]
   @ 4,1 TO 4,78 DOUBLE
   * ---display detail lines
   @  7,22 SAY [1. Update Personnel Listing]
   @  8,22 SAY [2. Update TDA Listing]
   @  9,22 SAY [3. Quick Update from RIR Report]
   @ 10,22 SAY [4. Update CME Listing/Budget]
   @ 11,22 SAY [5. Update Leave and Absence Listings]
   @ 12,22 SAY [6. Print Reports]
   @ 14, 22 SAY [0. EXIT]
   selectnum = 0
   @ 16,33 SAY " select      "
   @ 16,42 GET selectnum PICTURE "9" RANGE 0,6
   READ

   DO CASE

      CASE selectnum = 0
             CLEAR ALL
         RETURN

      CASE selectnum = 1
      *  DO Update Personnel Listing

         DO PMENU1

         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET
wait_subst
         READ
         SET CONFIRM ON

      CASE selectnum = 2
      *  DO Update TDA Listing

         DO PMENU2

         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET
wait_subst
         READ
         SET CONFIRM ON

      CASE selectnum = 3
      *  DO Quick Update from RIR Report

         DO PMENU3

         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET
wait_subst
         READ
         SET CONFIRM ON

      CASE selectnum = 4
      *  DO Update CME Listing/Budget

         DO PMENU4

         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET
wait_subst
         READ
         SET CONFIRM ON

      CASE selectnum = 5
      *  DO Update Leave and Absence Listings

         DO PMENU5

         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET
wait_subst
         READ
         SET CONFIRM ON

      CASE selectnum = 6
      *  DO Print Reports

         DO PMENU6

         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET
wait_subst
         READ
         SET CONFIRM ON
ENDCASE

ENDDO T
RETURN
* EOF: PMENU.PRG
^Z
```

```
* Program:
          PMENU1.PRG

* Author.: ELBERT T. SHAW & JOAN ZIMMERMAN
* Date...: 02/02/89
* Notice.:Copyright(c) 1989, E. T. SHAW & JOAN ZIMMERMAN,
All Rights Reserved
* Notes....:UPDATE PERSONNEL LISTING
SET TALK OFF
SET BELL OFF
SET ESCAPE OFF
SET CONFIRM ON
SELECT A
USE TDA INDEX TDA
SELECT B
USE PERSON INDEX p_TDA
SELECT A
JOIN WITH B TO TEMP FOR TDA_PARA=b->TDA_PARA .AND. ;
TDA_LINE=b->TDA_LINE .AND. TDA_POSN=B->TDA_POSN
CLOSE ALL
DO WHILE .T.

   * ---Display menu options, centered on the screen.
   *    draw menu border and print heading
   CLEAR
   @ 2, 0 TO 14,79 DOUBLE
   @ 3,17 SAY [U P D A T E   P E R S O N N E L   L I S T I N
G]
   @ 4,1 TO 4,78 DOUBLE
   * ---display detail lines
   @  7,30 SAY [1. ADD DEPARTMENT PERSONNEL]
   @  8,30 SAY [2. CHANGE INFORMATION ON A PERSON]
   @  9,30 SAY [3. DELETE PERSON FROM LISTING]
   @ 10,30 SAY [4. REVIEW ALL DEPARTMENT PERSONNEL
INFORMATION]
   @ 12, 30 SAY '0. EXIT'
   STORE 0 TO selectnum
   @ 14,33 SAY " select     "
   @ 14,42 GET selectnum PICTURE "9" RANGE 0,4
   READ

   DO CASE
      CASE selectnum = 0
         CLEAR ALL
         RETURN

      CASE selectnum = 1
      *  DO ADD INFORMATION
         Adding = .T.
         DO WHILE Adding
            CLEAR
            M_TDAPARA = 0
            M_TDALINE = 0
            M_TDAPOSN = 0
            M_code = SPACE(5)
            @ 6,0 TO 10,79 DOUBLE
            @ 7,10 SAY "ENTER THE ID CODE OF THE PERSON YOU
WISH TO      ADD:" GET M_CODE PICTURE "!9999"
            @ 8,10 SAY "or Press Return to QUIT"
            READ

            IF M_CODE = "  "
               Adding = .F.
               LOOP
            ENDIF
            USE PERSON
            GO TOP
            LOCATE FOR IDCODE=m_code
            IF FOUND()
               CLEAR
               MESSAGE = "ID CODE REQUESTED IS ALREADY USED
BY THE            PERSON SHOWN BELOW!"
               SET FORMAT TO CONFIRM
               READ
               CLOSE FORMAT
               LOOP
            ELSE
               TRY = .T.
               DO WHILE TRY
               M_TDAPARA = 0
               CLEAR
               SET FORMAT TO TDAINPUT
               READ
               CLOSE FORMAT
               USE TDA
               GO TOP
               LOCATE FOR TDA_PARA=M_TDAPARA .AND.
            TDA_LINE=M_TDALINE .AND. TDA_POSN=M_TDAPOSN
               IF FOUND()
               SET FORMAT TO POSITION
               READ
               CLOSE FORMAT
               ELSE
                  @ 12,0 TO 14,79 DOUBLE
                  @ 13,5 SAY "TDA POSITION NOT AUTHORIZED,
PRESS ;
                 RETURN TO TRY AGAIN..."
                  WAIT " "
                  LOOP
               ENDIF
               USE PERSON
               GO TOP
               LOCATE FOR TDA_PARA=M_TDAPARA .AND.
TDA_LINE=M_TDALINE .AND. TDA_POSN=M_TDAPOSN
               IF FOUND()
                  CLEAR
                  SET FORMAT TO OCCUPIED
                  READ
                  CLOSE FORMAT
                  @ 15,0
                  SET FORMAT TO CHOICE
                  READ
                  DO CASE

                     CASE ANSWER=1
                          REPLACE TDA_POSN WITH 99
                          SET FORMAT TO PERSON
                          APPEND BLANK
                          REPLACE IDCODE WITH M_CODE,;
                                  TDA_PARA WITH M_TDAPARA, ;

                                  TDA_LINE WITH M_TDALINE, ;

                                  TDA_POSN WITH M_TDAPOSN
                          READ
                          CLOSE FORMAT
                          TRY = .F.
                          LOOP

                     CASE ANSWER=2
                          SET FORMAT TO PERSON
                          APPEND BLANK
                          REPLACE IDCODE WITH M_CODE,;
                                  TDA_PARA WITH M_TDAPARA, ;

                                  TDA_LINE WITH M_TDALINE, ;

                                  TDA_POSN WITH 99
                          READ
                          CLOSE FORMAT
                          TRY = .F.
                          LOOP

                     CASE ANSWER=3
                          LOOP

                     ENDCASE
               ELSE
                   SET FORMAT TO PERSON
                   APPEND BLANK
                   REPLACE IDCODE WITH M_CODE,;
                           TDA_PARA WITH M_TDAPARA, ;
                           TDA_LINE WITH M_TDALINE, ;
                           TDA_POSN WITH M_TDAPOSN
                   READ
                   CLOSE FORMAT
                   TRY = .F.
               ENDIF

            ENDDO

         ENDIF
         YESNO = " "
         @ 6,0 TO 8,79 DOUBLE
         @ 7,15 SAY "DO YOU WISH TO ENTER SOCIAL ROSTER
         INFORMATION" GET YESNO PICTURE "!"
         READ
         IF YESNO = "Y"
         *   SET FORMAT TO PRIVATE
         *   APPEND BLANK
         *   REPLACE IDCODE WITH M_IDCODE
         *   CLOSE FORMAT
         *ENDIF
         *ENDDO (ADDING)
         SET CONFIPM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET
wait_subst
         READ
         SET CONFIRM ON

      CASE selectnum = 2
      *  DO CHANGE INFORMATION
         * SEEK M_CODE
         * IF BLANK, EXIT
         * IF FOUND()
         *   SET FORMAT TO PERSON
         *   CHECK TO INSURE POSITION IS NOT OCCUPIED BY
SOMEONE          *   IF OCCUPIED
```

```
          *       SET FORMAT TO CHOICE
          *       GET CHOICE AND EXECUTE PER ADDING
INSTRUCTIONS
          *    ENDIF
          *ELSE (i.e. NOT FOUND)
          *    NOTIFY USER ID NOT FOUND, GIVE OPTION TO SEARCH
BY       LAST NAME
          *    SEEK LAST NAME
          *    DISPLAY ALL WITH THIS LAST NAME, FIRST NAME AND
ID       CODE
          *    GIVE USER OPTION TO CHOSE WHICH RECORD NUMBER
          *    USER PICKS RECORD NUMBER
          *    GOTO RECORD SELECTED
          *    SET FORMAT TO PERSON
          *    CHECK TO INSURE POSITION IS NOT OCCUPIED BY
SOMEONE            *   IF OCCUPIED
          *       SET FORMAT TO CHOICE
          *       GET CHOICE AND EXECUTE PER ADDING
INSTRUCTIONS
          *    ENDIF
          CLEAR
          @ 6,0 TO 8,79 DOUBLE
          @ 7,15 SAY "DO YOU WISH TO CHANGE SOCIAL ROSTER
         INFORMATION" GET YESNO PICTURE "!"
          READ
          IF YESNO = "Y"
          *USE PRIVATE INDEX IDCODE
          *LOCATE FOR IDCODE=M_IDCODE
          *IF FOUND() DO FOLLOWING
          *    SET FORMAT TO PRIVATE
          *    APPEND BLANK
          *    REPLACE IDCODE WITH M_IDCODE
          *    CLOSE FORMAT
          *ENDIF
          *IF .NOT. FOUND()  &&IDCODE NOT IN PRIVATE FILE
          *    WAIT "ADDING A NEW RECORD, IDCODE NOT
FOUND..PRESS ;
          *RETURN TO CONTINUE..."
          *    SET FORMAT TO PRIVATE
          *    APPEND BLANK
          *    REPLACE IDCODE WITH M_IDCODE
          *    CLOSE FORMAT
          *ENDIF
          *ENDIF
          SET CONFIRM ON

      CASE selectnum = 3
      *  DO REMOVE INFORMATION

          @ 6,0 TO 10,79 DOUBLE
          @ 7,10 SAY "ENTER THE ID CODE OF THE PERSON YOU
WISH TO      REMOVE:"  GET M_CODE PICTURE "!9999"
          @ 8,10 SAY "or Press Return to QUIT"
          READ
          *SEEK M_CODE
          *IF BLANK, EXIT

          *IF FOUND()
          *MESSAGE = " IS THIS THE PERSON YOU WANT TO DELETE?
(Y/N)"
          *    SET FORMAT TO CONFIRM
          *    READ ANSWER
          *    IF ANSWER IS NO "N"
          *       LOOP TO TRY ANOTHER PERSON CODE
          *    ENDIF
          *    IF ANSWER IS YES "Y"
          *       ASK "ARE YOU SURE (Y/N)"
          *       IF SURE IS YES "Y"
          *          LOCATE AND DELETE (IN PERSON)
          *          USE ABSENSE
          *          LOCATE AND DELETE
          *          IF NOT FOUND() CONTINUE
          *          USE CMEREQ
          *          LOCATE AND DELETE
          *          IF NOT FOUND() CONTINUE
          *          USE PRIVATE
          *          LOCATE AND DELETE
          *          IF NOT FOUND() CONTINUE
          *       ELSE (ANSWER IS NO "N")
          *          CLEAR
          *          @5,0
          *          WAIT
          *       ENDIF
          *ELSE (i.e. NOT FOUND)
          *    NOTIFY USER ID NOT FOUND, GIVE OPTION TO SEARCH
BY          LAST NAME
          *    IF CHOICE IS TO SEEK BY LAST NAME
          *       SEEK LAST NAME
          *       DISPLAY ALL WITH THIS LAST NAME
          *       GIVE USER OPTION TO CHOSE WHICH RECORD
NUMBER
          *       USER PICKS RECORD NUMBER
          *       GOTO RECORD SELECTED
          *       DISPLAY LAST NAME, FIRST NAME, MI and RANK
          *       ASK "IS THIS THE PERSON YOU WISH TO DELETE?
(Y/N)"
          *       READ ANSWER
          *       IF ANSWER IS NO "N"
          *          LOOP TO TRY ANOTHER PERSON CODE
          *       ENDIF
          *       IF ANSWER IS YES "Y"
          *          STORE IDCODE TO M_IDCODE &IDCODE OF CURR
PERSON
          *          ASK "ARE YOU SURE (Y/N)"
          *             IF SURE IS YES "Y"
          *                LOCATE M_IDCODE AND DELETE (IN
PERSON)
          *                USE ABSENSE
          *                LOCATE AND DELETE
          *                 IF NOT FOUND() CONTINUE
          *                USE CMEREQ
          *                LOCATE M_IDCODE AND DELETE
          *                 IF NOT FOUND() CONTINUE
          *                USE PRIVATE
          *                LOCATE M_IDCODE AND DELETE
          *                 IF NOT FOUND() CONTINUE
          *             ELSE (ANSWER IS NO "N")
          *                CLEAR
          *                @5,0
          *                WAIT
          *             ENDIF
          *       ENDIF
          *    IF CHOICE IS NOT TO SEARCH FOR LAST NAME
          *       LOOP TO BEGINNING
          *    ENDIF
          *ENDIF
          @ 6,0 TO 8,79 DOUBLE
          @ 7,15 SAY "DO YOU WISH TO CHANGE SOCIAL ROSTER
INFORMATION" GET YESNO PICTURE "!"
          READ
          *IF YESNO = "Y"
              *USE PRIVATE INDEX IDCODE
              *LOCATE FOR IDCODE=M_IDCODE
              *IF FOUND() DO FOLLOWING
                  *SET FORMAT TO DELPRIVATE
                  *ASK "ARE YOU SURE (Y/N)"
                  *IF SURE IS YES "Y"
                  *    DELETE
                  *ELSE (ANSWER IS NO "N")
                  *    CLEAR
                  *    @5,0
                  *    WAIT
                  *ENDIF
              *ENDIF
              *IF .NOT. FOUND()  &&IDCODE NOT IN PRIVATE FILE
              *    WAIT "IDCODE NOT FOUND..PRESS RETURN TO
CONTINUE..."
              *ENDIF
              *
          SET TALK ON
          CLEAR
          @ 2,0 SAY ' '
          ? 'PACKING DATABASE TO REMOVE RECORDS MARKED FOR
             DELETION'
          *PACK ALL DATABASES USED
(PERSON,CMEREQ,ABSENCE,PRIVATE)            SET TALK OFF
          SET CONFIRM OFF
          STORE ' ' TO wait_subst
          @ 23,0 SAY 'Press any key to continue...' GET
wait_subst
          READ
          SET CONFIRM ON

      CASE selectnum = 4
      *  DO REVIEW INFORMATION &&ONLY PERSON FILE
                BROWSE NOAPPEND NOMENU
                                SET CONFIRM OFF
          STORE ' ' TO wait_subst
          @ 23,0 SAY 'Press any key to continue...' GET
wait_subst
          READ
          SET CONFIRM ON
ENDCASE

ENDDO T
RETURN
* EOF: PMENU1.PRG
^Z
```

```
* Program..:
            PMENU2.PRG

* Author...: ELBERT T. SHAW & JOAN ZIMMERMAN
* Date.....: 02/02/89
* Notice.:Copyright(c) 1989,ELBERT T. SHAW & JOAN ZIMMERMAN,
All Rights Reserved
* Notes....:UPDATE TDA LIST
SET TALK OFF
SET BELL OFF
```

```
SET ESCAPE OFF
SET CONFIRM ON
USE TDA

DO WHILE .T.

   * ---Display menu options, centered on the screen.
   *    draw menu border and print heading
   CLEAR
   @ 2, 0 TO 14,79 DOUBLE
   @ 3,23 SAY [U P D A T E   T D A   L I S T I N G]
   @ 4,1 TO 4,78 DOUBLE
   * ---display detail lines
   @  7,30 SAY [1. ADD A TDA POSITION]
   @  8,30 SAY [2. CHANGE A TDA POSITION'S INFORMATION]
   @  9,30 SAY [3. REMOVE A TDA POSITION]
   @ 10,30 SAY [4. REVIEW ALL TDA POSITIONS]
   @ 12, 30 SAY '0. EXIT'
   STORE 0 TO selectnum
   @ 14,33 SAY " select      "
   @ 14,42 GET selectnum PICTURE "9" RANGE 0,4
   READ
   DO CASE
      CASE selectnum = 0
         CLEAR ALL
         RETURN

      CASE selectnum = 1
      *  DO ADD INFORMATION
      *  ALLOWS YOU TO ADD A NEW TDA POSITION TO THE MASTER
LIST
         TRYING = .T.
         DO WHILE TRYING
            SET FORMAT TO TDAINPUT
            READ
            CLOSE FORMAT
            USE TDA
            GO TOP
            LOCATE FOR TDA_PARA=M_TDAPARA .AND.
            TDA_LINE=M_TDALINE .AND. TDA_POSN=M_TDAPOSN
            IF FOUND()
               CLEAR
              SET FORMAT TO OCCUPIED
               READ
               CLOSE FORMAT
            ELSE
               @ 12,0 TO 14,79 DOUBLE
               @ 13,5 SAY "TDA POSITION NOT IN CURRENT FILE,
PRESS ;
                RETURN TO ADD IT..."
               WAIT " "
               CLEAR
               M_AUTH = SPACE(1)
               @ 6,0 TO 8,79
               @ 7,15 SAY "IS THIS AN AUTHORIZED POSITION?
(Y/N)";
                        GET M_AUTH PICTURE "!"
               READ
               SET FORMAT TO TDA
               APPEND BLANK
               IF M_AUTH = "Y"
                  REPLACE AUTH WITH 1
               ELSE
                  REPLACE AUTH WITH 0
               ENDIF
               REPLACE TDA_PARA WITH M_TDAPARA, ;
                       TDA_LINE WITH M_TDALINE, ;
                       TDA_POSN WITH M_TDAPOSN
            READ
            CLOSE FORMAT
            ENDIF
         ENDDO
         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET
wait_subst
         READ
         SET CONFIRM ON

      CASE selectnum = 2
      *  DO CHANGE INFORMATION
      *  ALLOWS YOU THE CAPABILITY TO CHANGE A TDA
POSITION'S       INFO
         TRYING = .T.
         DO WHILE TRYING
            SET FORMAT TO TDAINPUT
            READ
            USE TDA
            GO TOP
            LOCATE FOR TDA_PARA=M_TDAPARA .AND.
    TDA_LINE=M_TDALINE .AND. TDA_POSN=M_TDAPOSN

            IF FOUND()
               CLEAR
               IF AUTH = 0
                  @ 6,0 TO 8,79
                  @ 7,15 SAY "DO YOU WANT TO CHANGE THIS TO
AN   AUTHORIZED POSITION? (Y/N)" GET M_AUTH PICTURE "!"
                  READ
                  IF M_AUTH = "Y"
                     REPLACE AUTH WITH 1
                  ENDIF
                  SET FORMAT TO TDA
                  READ & CANNOT CHANGE THE TDA POSITION
                  CLOSE FORMAT
               ELSE            && IF AUTH = 0
                  @ 6,0 TO 8,79
                  @ 7,15 SAY "DO YOU WANT TO CHANGE THIS TO
AN   UNAUTHORIZED POSITION? (Y/N)" GET M_AUTH PICTURE "!"
                  READ
                  IF M_AUTH = "Y"
                     REPLACE AUTH WITH 0
                  ENDIF
                  SET FORMAT TO TDA
                  READ & CANNOT CHANGE THE TDA POSITION
                  CLOSE FORMAT
            ELSE
               @ 12,0 TO 14,79 DOUBLE
               @ 13,5 SAY "TDA POSITION NOT IN CURRENT FILE,
PRESS ;
    RETURN TO TRY AGAIN..."
               WAIT " "
               LOOP
            ENDIF
         ENDDO
         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET
wait_subst
         READ
         SET CONFIRM ON

      CASE selectnum = 3
      *  DO REMOVE INFORMATION
      *  ALLOWS YOU TO DELETE A NO LONGER AUTHORIZED TDA
         POSITION
         TRYING = .T.
         DO WHILE TRYING
            SET FORMAT TO TDAINPUT
            READ
            USE TDA
            GO TOP
            LOCATE FOR TDA_PARA=M_TDAPARA .AND.
TDA_LINE=M_TDALINE .AND. TDA_POSN=M_TDAPOSN
            IF FOUND()
               YESNO = SPACE(1)
               CLEAR
               @ 2,0
               ? "JOBTITLE            APC CODE"
               ? JOBTITLE,APC
               @ 6,0 TO 8,79 DOUBLE
               @ 7,15 SAY "IS THIS THE TDA POSITION YOU WANT
TO   DELETE? (Y/N)" GET YESNO PICTURE "!"
               READ
               IF YESNO = "Y"
                  DELETE
                  USE PERSON
                  INDEX ON TDA_PARA .AND. TDA_LINE .AND.
TDA_POSN TO              TEMP
                  SET INDEX TO TEMP
                  LOCATE FOR TDA_PARA=M_TDAPARA .AND.
    TDA_LINE=M_TDALINE .AND. TDA_POSN=M_TDAPOSN
                  IF FOUND()
                     REPLACE TDA_PARA WITH 0, ;
                             TDA_LINE WITH 0, ;
                             TDA_POSN WITH 0
                     CLEAR
                     @ 6,0 TO 9,79 DOUBLE
                     @ 7,5 SAY "FOUND "+RANK+" "+LNAME+" WHO
IS
    OCCUPYING THE DELETED POSITION, IDCODE
IS"+STR(IDCODE,5)
                     @ 8,5 SAY "BE SURE YOU UPDATE THIS
PERSON'S TDA     POSITION WITH A VALID TDA POSITION!"
                     @ 12,0
                     WAIT
                  ENDIF
               ELSE && YESNO= "N"
                  LOOP
               ENDIF


            ELSE &&POSITION WAS NOT FOUND
               @ 12,0 TO 14,79 DOUBLE
               @ 13,5 SAY "TDA POSITION NOT IN CURRENT FILE,
PRESS ;
    RETURN TO TRY AGAIN..."
               WAIT " "
               LOOP
            ENDIF

         ENDDO
```

```
         SET INDEX TO
         ERASE TEMP.NDX
         SET TALK ON
         CLEAR
         @ 2,0 SAY ' '
         ? 'PACKING DATABASE TO REMOVE RECORDS MARKED FOR
    DELETION'
         PACK
         SET TALK OFF
         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET
wait_subst
         READ
         SET CONFIRM ON

      CASE selectnum = 4
      *  DO REVIEW INFORMATION
                              *  ALLOWS YOU TO REVIEW THE
COMPLETE FILE

         INDEX ON TDA_PARA .AND. TDA_LINE .AND. TDA_POSN TO
TEMP
         SET INDEX TO TEMP
         BROWSE NOAPPEND NOMENU
         ERASE TEMP.NDX
         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET
wait_subst
         READ
         SET CONFIRM ON
ENDCASE

ENDDO T
RETURN
* EOF: PMENU2.PRG
^Z
```

```
* Program..:
            PMENU3.PRG


* Author...: ELBERT T. SHAW & JOAN ZIMMERMAN
* Date.....: 02/02/89
* Notice: Copyright(c) 1989,ELBERT T. SHAW & JOAN ZIMMERMAN,
All Rights Reserved
* NOTES : QUICK UPDATE FROM RIR REPORT
SET TALK OFF
SET BELL OFF
SET ESCAPE OFF
SET CONFIRM ON
USE PERSON
DO WHILE .T.

   * ---Display menu options, centered on the screen.
   *    draw menu border and print heading
   CLEAR
   @ 2, 0 TO 12,79 DOUBLE
   @ 3,13 SAY [Q U I C K   U P D A T E   F R O M   R I R   R
E P O R T]
   @ 4,1 TO 4,78 DOUBLE
   * ---display detail lines
   @  7,23 SAY [1. Update Losses]
   @  8,23 SAY [2. Update Changes to TDA Positions]
   @ 10, 23 SAY '0. EXIT'
   STORE 0 TO selectnum
   @ 12,33 SAY " select      "
   @ 12,42 GET selectnum PICTURE "9" RANGE 0,2
   READ

   DO CASE
      CASE selectnum = 0
         CLEAR ALL
         RETURN

      CASE selectnum = 1
      *  DO Update Losses

         *DO WHILE TRYING && MASTER LOOP FOR MULTIPLE
ENTRIES

         M_UPDATETYPE = 1
         @ 6,0 TO 9,79 DOUBLE
         @ 7,10 SAY "HAS THIS PERSON ACTUALLY DEPARTED OR IS
THIS    AN UPDATE TO A PROJECTED LOSS DATE? (ACTUAL=0,
UPDATE  DATE=1)" GET M_UPDATETYPE PICTURE "9" RANGE 0,1
         READ

         @ 15,0 TO 19,79 DOUBLE
         @ 16,10 SAY "ENTER THE ID CODE OF THE PERSON
    WHO"+IFF(M_UPDATETYPE =1, "LOSS DATE NEEDS CHANGING",
    "DEPARTED")+":" GET M_CODE PICTURE "!9999"
         @ 17,10 SAY "or Press Return to QUIT"
         READ
         *USE PERSON
         *SEEK M_CODE
         *IF BLANK, EXIT
         *IF FOUND()
         *   DISPLAY LAST NAME, FIRST, AND RANK
         *   MESSAGE = "IS THIS THE PERSON YOU WISH TO
MODIFY? (Y/N)"
         *   SET FORMAT TO CONFIRM
         *   IF ANSWER IS NO "N"
         *      LOOP TO TRY ANOTHER PERSON CODE
         *   ENDIF
         *   IF ANSWER IS YES "Y"
         *      IF M_UPDATETYPE IS 1  &&APPEND NEW LOSS DATE
         *         CLEAR
         *         @ 6,0 TO 8,79 DOUBLE
         *         @ 7,15 SAY "ENTER NEW LOSS DATE:
(MM/DD/YY)";
         *                 GET M_LOSS PICTURE "99/99/99"
         *         READ
         *         REPLACE ALOSS WITH M_LOSS
         *         LOOP TO DO ANOTHER PERSON
         *      ENDIF
         *      ASK "ARE YOU SURE (Y/N)"
         *      IF SURE IS YES "Y"
         *         LOCATE AND DELETE (IN PERSON)
         *         USE ABSENSE
         *         LOCATE AND DELETE
         *          IF NOT FOUND() CONTINUE
         *         USE CMEREQ
         *         LOCATE AND DELETE
         *          IF NOT FOUND() CONTINUE
         *         USE PRIVATE
         *         LOCATE AND DELETE
         *          IF NOT FOUND() CONTINUE
         *      ELSE (ANSWER IS NO "N")
         *         CLEAR
         *         @5,0
         *         WAIT
         *      ENDIF

         *ELSE (i.e. NOT FOUND)
         *   NOTIFY USER ID NOT FOUND, GIVE OPTION TO SEARCH
BY          LAST NAME
         *   IF CHOICE IS TO SEEK BY LAST NAME
         *      SEEK LAST NAME
         *      DISPLAY ALL WITH THIS LAST NAME
         *      GIVE USER OPTION TO CHOSE WHICH ID CODE
         *      USER PICKS ID CODE
         *      GOTO ID CODE SELECTED
         *      DISPLAY LAST NAME, FIRST NAME, MI and RANK
         *      MESSAGE="IS THIS THE PERSON YOU WISH TO
DELETE?(Y/N)
         *      SET FORMAT TO CONFIRM
         *      READ ANSWER
         *      IF ANSWER IS NO "N"
         *         LOOP TO TRY ANOTHER PERSON CODE
         *      ENDIF
         *      IF ANSWER IS YES "Y"
         *         STORE IDCODE TO M_IDCODE
         *         ASK "ARE YOU SURE (Y/N)"
         *            IF SURE IS YES "Y"
         *               LOCATE M_IDCODE AND DELETE (IN
PERSON)
         *               USE ABSENSE
         *               LOCATE AND DELETE
         *                IF NOT FOUND() CONTINUE
         *               USE CMEREQ
         *               LOCATE M_IDCODE AND DELETE
         *                IF NOT FOUND() CONTINUE
         *               USE PRIVATE
         *               LOCATE M_IDCODE AND DELETE
         *                IF NOT FOUND() CONTINUE
         *            ELSE (ANSWER IS NO "N")
         *               CLEAR
         *               @5,0
         *               WAIT
         *            ENDIF
         *      ENDIF
         *   IF CHOICE IS NOT TO SEARCH FOR LAST NAME
         *      LOOP TO BEGINNING
         *   ENDIF
         *ENDIF
         *ENDDO
         *

         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET
wait_subst
         READ
         SET CONFIRM ON
```

```
      CASE selectnum = 2
      *  DO Update Changes to TDA Positions

         *DO WHILE TRUE
         *ALLOWS YOU TO CHANGE THE TDA POSITION FROM THE RIR
         SET FORMAT TO PERRIR   && screen of memory variable
         READ
         *IF M_TDAPARA = 0
         *   EXIT
         *ENDIF
         *USE PERSON
         *LOCATE FOR TDA_PARA=M_TDAPARA .AND.
TDA_LINE=M_TDALINE          *.AND. TDA_POSN=M_TDAPOSN
         *IF FOUND().. MEANS THAT THE NEW POSITION IS
OCCUPIED, GIVE        CHOICES AS LISTED BELOW
         *     STORE IDCODE TO OLDPERSON  &&RECORD WHO THE
PERSON      *    CLEAR
         *     @ 7,0
         *     SET FORMAT TO CHOICE
         *     READ
         *     DO CASE
         *        CASE ANSWER=1
         *           USE TDA
         *           && LOOK FOR THE TDA TO MAKE SUFE IT IS
O.K.
         *           LOCATE FOR TDA_PARA=M_TDAPARA .AND.
      TDA_LINE=M_TDALINE .AND. TDA_POSN=M_TDAPOSN
         *           IF FOUND()  &&AUTHORIZED SLOT
         *              USE PERSON
         *              LOCATE FOR IDCODE=M_IDCODE  && PERSON
TO      CHANGE POSN
         *              IF .NOT. FOUND()
         *                CLEAR
         *                @ 6,0 TO 8,79 DOUBLE
         *                @ 7,15 SAY "IDCODE DOES NOT EXIST,
PRESS RETURN          TO TRY AGAIN.."
         *                LOOP
         *              ENDIF
         *              REPLACE TDA_PARA WITH M_TDAPARA, ;
         *                      TDA_LINE WITH M_TDALINE, ;
         *                      TDA_POSN WITH M_TDAPOSN
         *              GO TOP
         *              LOCATE FOR IDCODE=OLDPERSON
         *              REPLACE TDA_POSN WITH 99  &&PUT THE
OLDE         PERSON IN EXCESS
         *           ELSE
         *              @ 6,0 TO 8,79 DOUBLE
         *              @ 7,5 SAY "TDA POSITION ENTERED IS
NOT AN      AUTHORIZED TDA POSITION"
         *CHECK INFORMATION AND PRESS RETURN TO TRY
AGAIN..."
         *              WAIT " "
         *              LOOP
         *           ENDIF
         *           REPLACE TDA_POSN WITH 99
         *           TRY = .F.
         *           LOOP

         *        CASE ANSWER=2
         *           USE TDA
         *           && LOOK FOR THE TDA TO MAKE SURE IT IS
O.K.
         *           LOCATE FOR TDA_FARA=M_TDAPARA .AND.
      TDA_LINE=M_TDALINE .AND. TDA_POSN=M_TDAPOSN
         *           IF FOUND()  &&AUTHORIZED SLOT
         *              USE PERSON
         *              LOCATE FOP IDCODE=M_IDCODE  && PERSON
TO      CHANGE POSN
         *              IF .NOT. FOUND()
         *                CLEAR
         *                @ 6,0 TO 8,79 DOUBLE
         *                @ 7,15 SAY "IDCODE DOES NOT EXIST,
PRESS RETURN                      TO TRY AGAIN.."
         *                LOOP
         *              ENDIF
         *              REPLACE TDA_PARA WITH M_TDAPARA, ;
         *                      TDA_LINE WITH M_TDALINE, ;
         *                      TDA_POSN WITH 99
         *              GO TOP
         *              LOCATE FOR IDCODE=OLDPEPSON
         *              REPLACE TDA_FOSN WITH 99  &&PUT THE
OLDE                     PERSON IN EXCESS
         *           ELSE
         *              @ 6,0 TO 8,79 DOUBLE
         *              @ 7,5 SAY "TDA POSITION ENTEPED IS
NOT AN      *                 AUTHORIZED TDA POSITION
         *CHECK INFORMATION AND PRESS RETURN TO TRY
AGAIN..."
         *              WAIT " "
         *              LOOP
         *           ENDIF
         *           TRY = .F.
         *           LOOP

         *        CASE ANSWER=2
         *           LOOP
         *        ENDCASE
         *ELSE   &&FEPSON NOT FOUND() IN POSITION DESIRED
         *   CLEAF
         *   USE TDA
         *   LOCATE FOP TDA_PARA=M_TDAPARA .AND.
TDA_LINE=M_TDALINE .AND. TDA_POSN=M_TDAPOSN
         *   IF FOUND()  &&AUTHORIZED SLOT
         *      USE PERSON
         *      LOCATE FOR IDCODE=M_IDCODE  && PERSON TO
CHANGE                 POSN
         *      IF .NOT. FOUND()
         *         CLEAR
         *         @ 6,0 TO 8,79 DOUBLE
         *         @ 7,15 SAY "IDCODE DOES NOT EXIST, PRESS
RETURN TO        TRY AGAIN.."
         *         LOOP
         *      ENDIF
         *      REPLACE TDA_FARA WITH M_TDAPAPA, ;
         *              TDA_LINE WITH M_TDALINE, ;
         *              TDA_POSN WITH M_TDAPOSN
         *   ELSE
         *      @ 6,0 TO 8,79 DOUBLE
         *      @ 7,5 SAY "TDA FOSITION ENTERED IS NOT AN
AUTHORIZED          TDA POSITION"
         *CHECK INFORMATION AND PRESS RETURN TO TRY
AGAIN..."
         *      WAIT " "
         *      LOOP
         *   ENDIF
         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET
wait_subst
         READ
         SET CONFIRM ON
ENDCASE

ENDDO T
RETURN
* EOF: PMENU3.PRG
^Z
```

```
* Program..:
            PMENU4.PRG

* Author...: ELBERT T. SHAW & JOAN ZIMMERMAN
* Date.....: 02/02/89
* Notice: Copyright (c) 1989,ELBERT T. SHAW & JOAN
ZIMMERMAN, All Rights Reserved
* Notes....: UPDATE CME LIST/BUDGET

SET TALK OFF
SET BELL OFF
SET ESCAPE OFF
SET CONFIRM ON

DO WHILE .T.

   * ---Display menu options, centered on the screen.
   *    draw menu border and print heading
   CLEAR
   @ 2, 0 TO 14,79 DOUBLE
   @ 3,19 SAY [U P D A T E   C M E   I N F O R M A T I O N]
   @ 4,1 TO 4,78 DOUBLE
   * ---display detail lines
   @  7,20 SAY [1. Update Allocation for Fiscal Year]
   @  8,20 SAY [2. Update CME Requests]
   @  9,20 SAY [3. Update CME Requests with Actual Costs]
   @ 10,20 SAY [4. Print Reports]
   @ 12, 20 SAY '0. EXIT'
   STORE 0 TO selectnum
   @ 14,33 SAY " select     "
   @ 14,42 GET selectnum PICTURE "9" RANGE 0,4
   READ

   DO CASE
      CASE selectnum = 0
         CLEAR ALL
         RETURN

      CASE selectnum = 1
      *  DO Update Allocation for Fiscal Year

         DO pmenu4_1

         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET
wait_subst
         READ
         SET CONFIRM ON
```

```
      CASE selectnum = 2
      *  DO Update CME Requests

         DO PMENU4_2

         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET
wait_subst
         READ
         SET CONFIRM ON

      CASE selectnum = 3
      *  DO Update CME Requests with Actual Costs

         DO PMENU4_3

         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET
wait_subst
         READ
         SET CONFIRM ON

      CASE selectnum = 4
      *  DO Print Reports

         DO PMENU4_4
         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET
wait_subst
         READ
         SET CONFIRM ON
ENDCASE

ENDDO T
RETURN
* EOF: PMENU4.PRG
^Z
```

```
* Program..:
             PMENU4_1.PRG

* Author...: ELBERT T. SHAW & JOAN ZIMMERMAN
* Date.....: 02/02/89
* Notice...: Copyright (c) 1989,ELBERT T. SHAW & JOAN
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* Notes....: UPDATE ALLOCATION FOR FY


SET TALK OFF
SET BELL OFF
SET ESCAPE OFF
SET CONFIRM ON
M_FY = 0

* Clear Screen for FY input an allow for the user to select
the Fiscal Year
* Typically, the user will only be operating in one FY

CLEAR
@6,0 to 8,79 DOUBLE
@7,15 SAY "Enter the Fiscal Year for the CME Allocations:" ;

      GET M_FY PICTURE "99"
READ

DO WHILE .T.

   * ---Display menu options, centered on the screen.
   *    draw menu border and print heading
   CLEAR
   M_ALLOCATION = 0
   @ 6,0 TO 9,79 DOUBLE
   @ 7,15 SAY "ENTEF ALLOCATION FOR FISCAL YEAR
"+STR(M_FY,2)
         GET  M_ALLOCATION  PICTURE "999999.99"
   @ 8,15 SAY "OR PRESS RETURN TO QUIT"
   READ
   IF M_ALLOCATION = 0
      EXIT
   ENDIF
   USE CMEALLOC
   LOCATE FOR FY=M_FY
   IF FOUND()
      CLEAR
      @ 6,0 TO 8,79 DOUBLE
      @ 7,15 SAY "ALLOCATION FOR FISCAL YEAR "+STR(M_FY,2)+"
ALREADY EXISTS";
      @ 8,15 SAY "PRESS RETURN TO EDIT IT"
      WAIT " "
      SET FORMAT TO CMEALLOC
      READ
      LOOP
   ELSE  && ALLOCATION FOR FY IS A NEW ONE
      APPEND BLANK
      REPLACE ALLOCATION WITH M_ALLOCATION
      REPLACE FY WITH M_FY
      LOOP
   ENDIF
ENDDO T
RETURN
* EOF: PMENU4_1.PRG
^Z
```

```
* Program..:
             PMENU4_2.PRG

* Author...: ELBERT T. SHAW & JOAN ZIMMERMAN
* Date.....: 02/02/89
* Notice...: Copyright (c) 1989,ELBERT T. SHAW & JOAN
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* Notes....: UPDATE CME REQUESTS


SET TALK OFF
SET BELL OFF
SET ESCAPE OFF
SET CONFIRM ON
M_FY = 0

* Clear Screen for FY input an allow for the user to select
the Fiscal Year
* Typically, the user will only be operating in one FY

CLEAR
@6,0 to 8,79 DOUBLE
@7,15 SAY "Enter the Fiscal Year for the CME Allocations:" ;

      GET M_FY PICTURE "99"
READ

DO WHILE .T.

   * ---Display menu options, centered on the screen.
   *    draw menu border and print heading
   CLEAR
   @ 2, 0 TO 14,79 DOUBLE
   @ 3,21 SAY [U P D A T E   C M E   R E Q U E S T S]
   @ 4,1 TO 4,78 DOUBLE
   * ---display detail lines
   @  7,30 SAY [1. ADD A NEW CME REQUEST FOR FY
]+STR(M_FY,2)
   @  8,30 SAY [2. CHANGE A CME REQUEST'S INFORMATION FOP FY
]+STR(M_FY,2)
   @  9,30 SAY [3. DELETE A CME REQUEST FOR FY ]+STR(M_FY,2)
   @ 10,30 SAY [4. REVIEW ALL CME REQUESTS FOR FY
]+STR(M_FY,2)
   @ 12, 30 SAY '0. EXIT'
   STORE 0 TO selectnum
   @ 14,33 SAY " select     "
   @ 14,42 GET selectnum PICTURE "9" RANGE 0,4
   READ

   DO CASE
      CASE selectnum = 0
         CLEAR ALL
         RETURN

      CASE selectnum = 1
      *  DO ADD INFORMATION

         DO WHILE .T.
         @ 6,0 TO 9,79 DOUBLE
         @ 7,15 SAY "ENTER THE ID CODE OF THE PEPSON TO ADD
THE      REQUEST: ";
               GET M_IDCODE PICTURE "!999"
         @ 8,15 SAY "OP PPESS RETURN TO QUIT"

         IF M_IDCODE= ""
            EXIT
         ENDIF

         USE PERSON
         LOCATE FOR IDCODE=M_IDCODE
         IF FOUND() &&PERSON DOES EXIST IN MASTER FILE
            ANSWER = " "
            MESSAGE= "IS THIS THE PERSON YOU EXPECTED? (Y/N)
"
            SET FORMAT TO CONFIRM
            READ
```

```
            IF ANSWER = "Y" &&the right person
               USE CMEREQ
               SET FILTER TO FY=M_FY
               GO TOP
               SET FORMAT TO CMEREQ
               APPEND BLANK
               REPLACE IDCODE WITH M_IDCODE
               REPLACE FY WITH M_FY
               READ
               REPLACE TOTALCOST WITH
TRAVELCOST+PERDIEM+REGFEE+REIMB
               CLOSE FORMAT
               SET FILTER TO
               LOOP
            ELSE
               LOOP
            ENDIF
         ELSE
            @ 6,0 TO 8,79 DOUBLE
            @ 7,15 SAY "THERE IS NOT A PERSON WITH THAT
IDCODE,          PRESS RETURN TO TRY AGAIN..."
            WAIT " "
            LOOP
         ENDIF
         ENDDO
         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET
wait_subst
         READ
         SET CONFIRM ON

      CASE selectnum = 2
      *  DO CHANGE INFORMATION

         DO WHILE .T.

         @ 6,0 TO 9,79 DOUBLE
         @ 7,15 SAY "ENTER THE ID CODE OF THE PERSON YOU
WANT TO      CHANGE: " GET M_IDCODE PICTURE "!999"
         @ 8,15 SAY "OR PRESS RETURN TO QUIT"

         IF M_IDCODE= ""
            EXIT
         ENDIF

         USE PERSON
         LOCATE FOR IDCODE=M_IDCODE
         IF FOUND() &&PERSON DOES EXIST IN MASTER FILE
            ANSWER = " "
            MESSAGE= "IS THIS THE PERSON YOU EXPECTED? (Y/N)
"
            SET FORMAT TO CONFIRM
            READ
            IF ANSWER = "Y" &&the right person
               USE CMEREQ
               SET FILTER TO IDCODE=M_IDCODE .AND. FY=M_FY
               CLEAR
               @ 6,0
               DISPLAY FIELDS IDCODE,TYPE,START,END WHILE
            IDCODE=M_IDCODE
               @ 20, 0 CLEAR
               @ 22,0 SAY "ENTER THE RECORD NUMBER OF THE
CME          REQUEST YOU DESIRE TO CHANGE. (1-"+
STR(RECCOUNT(),4)+")";
                GET RECORD PICTURE "9999"
               READ
               IF RECORD > 0 .AND. RECORD < RECCOUNT()
                  CLEAR
                  DO WHILE .T.
                  @ 6,0 TO 8,79 DOUBLE
                  @ 7,5 SAY "WILL COSTS BE ACTUAL COSTS OR
ESTIMATED;
                 (ENTER AN -A- FOR ACTUAL OR AN -E- FOR
ESTIMATED)" GET M_CCODE  PICTURE "!"
                  IF M_CCODE # "A" .OR. M_CCODE # "E"
                     CLEAR
                     @ 6,0 TO 8,79 DOUBLE
                     @ 7,15 SAY "YOU HAVE ENTERED A WRONG
LETTER,              PRESS RETURN TO TRY AGAIN.."
                     WAIT " "
                     LOOP
                  ENDIF
                  GOTO RECORD
                  SET FORMAT TO CMEREQ
                  REPLACE C_CODE WITH M_CCODE
                  READ
                  REPLACE TOTALCOST WITH
                TRAVELCOST+PERDIEM+REGFEE+REIMB
                  CLOSE FORMAT
                  EXIT
                  ENDDO
               ELSE
                  @ 20,0 CLEAR
                  @ 23,5 SAY "NO SUCH RECORD:
"+STR(RECORD,4)
                  ? CHR(7)
                  WAIT
               ENDIF
               SET FILTER TO
               LOOP
            ELSE
               SET FILTER TO
               LOOP
            ENDIF
         ELSE
            @ 6,0 TO 8,79 DOUBLE
            @ 7,15 SAY "THERE IS NOT A PERSON WITH THAT
IDCODE,          PRESS RETURN TO TRY AGAIN..."
            WAIT " "
            LOOP
         ENDIF
         ENDDO
         SET FILTER TO

         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET
wait_subst
         READ
         SET CONFIRM ON

      CASE selectnum = 3
      *  DO REMOVE INFORMATION

         DO WHILE .T.
         @ 6,0 TO 9,79 DOUBLE
         @ 7,15 SAY "ENTER THE ID CODE OF THE PERSON TO
DELETE       THEIR REQUEST: "  GET M_IDCODE PICTURE "!999"
         @ 8,15 SAY "OR PRESS RETURN TO QUIT"

         IF M_IDCODE= ""
            EXIT
         ENDIF

         USE PERSON
         LOCATE FOR IDCODE=M_IDCODE
         IF FOUND() &&PERSON DOES EXIST IN MASTER FILE
            RIGHT = " "
            SET FORMAT TO CMEVAL
            READ
            IF RIGHT = "Y" &&the right person
               USE CMEREQ
               SET FILTER TO IDCODE=M_IDCODE .AND. FY=M_FY
               CLEAR
               @ 6,0
               DISPLAY FIELDS IDCODE,TYPE,START,END WHILE
             IDCODE=M_IDCODE
               @ 20, 0 CLEAR
               @ 22,0 SAY "ENTER THE RECORD NUMBER OF THE
CME          REQUEST YOU DESIRE TO DELETE. (1-
"+STR(RECCOUNT(),4)+")";
                GET RECORD PICTURE "9999"
               READ
               IF RECORD > 0 .AND. RECORD < RECCOUNT()
                  GOTO RECORD
                  SET FORMAT TO DELCMEREQ
                  READ
                  IF UPPER(MAYBE)= "Y"
                     DELETE
                  ENDIF
                  CLOSE FORMAT
               ELSE
                  @ 20,0 CLEAR
                  @ 23,5 SAY "NO SUCH RECORD:
"+STR(RECORD,4)
                  ? CHR(7)
                  WAIT
               ENDIF
               LOOP
         ELSE
            @ 6,0 TO 8,79 DOUBLE
            @ 7,15 SAY "THERE IS NOT A PERSON WITH THAT
IDCODE,          PRESS RETURN TO TRY AGAIN..."
            WAIT " "
            LOOP
         ENDIF
         ENDDO
         SET FILTER TO
         SET TALK ON
         CLEAR
         @ 2,0 SAY ' '
         ? 'PACKING DATABASE TO REMOVE RECORDS MARKED FOR
DELETION'
         PACK

         SET TALK OFF
         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET
wait_subst
         READ
```

```
        SET CONFIRM ON

      CASE selectnum = 4
      *  DO REVIEW INFORMATION
         SELECT A
         USE CMEREQ
         INDEX ON IDCODE TO TEMP
         SELECT B
         USE PERSON
         INDEX ON IDCODE TO TEMP1
         JOIN WITH A TO TEMPJOIN FOR IDCODE=A->IDCODE FIELDS
        A->IDCODE,B->RANK,B->FNAME,;
        B->LNAME,A->TYPE,A->START,A->END,A->LOCATION,A-
>PURPOSE,;
        A->TVLCOST,A->PERDIEM,A->REGFEE,A->REIMB,A-
>TOTALCOST,;
        A->C_CODE,A->FY
         USE TEMPJOIN
         SET FILTER TO FY=M_FY
         BROWSE NOAPPEND NOMENU
         ERASE TEMP.NDX
         ERASE TEMP1.NDX
         ERASE TEMPJOIN.DBF
         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET
wait_subst
         READ
         SET CONFIRM ON
ENDCASE

ENDDO T
RETURN

* EOF: PMENU4_2.PRG
^Z
```

```
* Program..:
              PMENU4_3.PRG

* Author...: ELBERT T. SHAW & JOAN ZIMMERMAN
* Date.....: 02/02/89
* Notice...: Copyright (c) 1989,ELBERT T. SHAW & JOAN
ZIMMERMAN, All Rights Reserved
* Notes....: UPDATE CME REQUEST WITH ACTUAL COSTS


SET TALK OFF
SET BELL OFF
SET ESCAPE OFF
SET CONFIRM ON
M_FY = 0

* Clear Screen for FY input an allow for the user to select
the Fiscal Year
* Typically, the user will only be operating in one FY

CLEAR
@6,0 to 8,79 DOUBLE
@7,15 SAY "Enter the Fiscal Year for the CME Allocations:" ;

      GET M_FY PICTURE "99"
READ

DO WHILE .T.

   * ---Display menu options, centered on the screen.
   *    draw menu border and print heading
   CLEAR
   M_IDCODE = SPACE(5)
   RECORD = 0
   @ 6,0 TO 8,79 DOUBLE
   @ 7,15 SAY "ENTER THE ID CODE OF THE PERSON YOU WANT TO
    UPDATE WITH ACTUAL COST OF TRAVEL";
    GET M_IDCODE  PICTURE "!999"
   READ
   USE CMEREQ
   SET FILTER TO IDCODE=M_IDCODE .AND. FY=M_FY
   CLEAR
   @ 6,0
   DISPLAY FIELDS IDCODE,TYPE,STAPT,END WHILE
IDCODE=M_IDCODE
   @ 20, 0 CLEAR
   @ 22,0 SAY "ENTER THE RECORD NUMBER OF THE CME REQUEST
YOU DESIRE TO CHANGE. (1-"+STR(RECCOUNT(),4)+")";
      GET RECORD PICTURE "9999"
   READ
   IF RECORD > 0 .AND. RECORD < RECCOUNT()
      GOTO RECORD
      SET FORMAT TO UPCMEREQ
      REPLACE C_CODE WITH A
      READ
      REPLACE TOTALCOST WITH TRAVELCOST+PERDIEM+REGFEE+REIMB
      CLOSE FORMAT
   ELSE
      @ 20,0 CLEAR
      @ 22,5 SAY "NO SUCH RECORD: "+STR(RECORD,4)
      ? CHR(7)
      WAIT
   ENDIF
ENDDO T
RETURN
* EOF: PMENU4_3.PRG
^Z
```

```
* Program..:
              PMENU4_4.PRG

* Author...: ELBERT T. SHAW & JOAN ZIMMERMAN
* Date.....: 02/02/89
* Notice...: Copyright (c) 1989, ELBERT T. SHAW & JOAN
ZIMMERMAN, All Rights Reserved
* Notes....:  PRINT CME REPORTS


SET TALK OFF
SET BELL OFF
SET ESCAPE OFF
SET CONFIRM ON
M_FY = 0

* Clear Screen for FY input an allow for the user to select
the Fiscal Year
* Typically, the user will only be operating in one FY

CLEAR
@6,0 to 8,79 DOUBLE
@7,15 SAY "Enter the Fiscal Year for the CME Allocations:" ;

      GET M_FY PICTURE "99"
READ

DO WHILE .T.

   * ---Display menu options, centered on the screen.
   *    draw menu border and print heading
   CLEAR
   @ 2, 0 TO 11,79 DOUBLE
   @ 3,23 SAY [P R I N T   C M E   R E P O R T S]
   @ 4,1 TO 4,78 DOUBLE
   * ---display detail lines
   @  7,30 SAY [1. ESTIMATED CME EXPENSES REPORT FOR FY]
    +STR(M_FY,2)
   @  8,30 SAY [2. ACTUAL CME EXPENSES REPORT FOR
FY]+STR(M_FY,2)
   @  10,34 SAY '0. EXIT'
   STORE 0 TO selectnum
   @ 11,33 SAY " select      "
   @ 11,42 GET selectnum PICTURE "9" RANGE 0,0
   READ

   DO CASE
      CASE selectnum = 0
         CLEAR ALL
         RETURN

      CASE SELECTNUM = 1

         *JOIN CMEREQ WITH PERSON TO JOINFILE FOR IDCODE
         *USE CMEALLOC AND GET ALLOCATION FOR SELECTED FY
         *STORE ALLOCATION TO FY_ALLOCATION
         *USE JOINFILE INDEXED ON START DATE
         *SET FILTER TO FY=M_FY
         *SUM TOTAL FOR C_CODE="A" TO A_TOTAL
         *SUM TOTAL FOR C_CODE="E" TO E_TOTAL
         *REPORT WILL DISPLAY FY_ALLOCATION LESS A_TOTAL AND
         *     TOTAL ESTIMATED COSTS REMAINING, E_TOTAL
         *
         *ESTIMATED CME REPOPT PRINTED HERE

      CASE SELECTNUM = 2

         *JOIN CMEREQ WITH PERSON TO JOINFILE FOR IDCODE
         *USE CMEALLOC AND GET ALLOCATION FOR SELECTED FY
         *STORE ALLOCATION TO FY_ALLOCATION
         *USE JOINFILE INDEXED ON START DATE
         *SET FILTER TO FY=M_FY
         *SUM TOTAL FOR C_CODE="A" TO A_TOTAL
         *SUM TOTAL FOR C_CODE="E" TO E_TOTAL
         *SET FILTER TO
         *SET FILTER TO C_CODE="A" .AND. FY=M_FY
         *REPORT WILL DISPLAY FY_ALLOCATION LESS A_TOTAL
         *BUT WILL NOT DISPLAY ESTIMATED ENTRIES
         *TOTAL ESTIMATED COSTS,E_TOTAL, REMAINING WILL BE A
```

```
        COMMENT AT BOTTOM
         *   OF REPORT
         *
         *ACTUAL CME REPORT PRINTED HERE

    ENDCASE

ENDDO T
RETURN
* EOF: PMENU4_4.PRG
^Z
```

```
* Program..:
            PMENU5.PRG

* Author...: ELBERT T. SHAW & JOAN ZIMMERMAN
* Date.....: 02/02/89
* Notice...: Copyright (c) 1989, ELBERT T. SHAW & JOAN
ZIMMERMAN, All Rights Reserved
* Notes....: UPDATE LEAVE/ABSENSE REQUESTS
SET TALK OFF
SET BELL OFF
SET ESCAPE OFF
SET CONFIRM ON
USE ABSENCE
M_FY = 0

* Clear Screen for FY input an allow for the user to select
the Fiscal Year
* Typically, the user will only be operating in one FY
CLEAR
@6,0 to 8,79 DOUBLE
@7,15 SAY "Enter the Fiscal Year for the CME Allocations:" ;

      GET M_FY PICTURE "99"
READ
DO WHILE .T.

   * ---Display menu options, centered on the screen.
   *    draw menu border and print heading
   CLEAR
   @ 2, 0 TO 14,79 DOUBLE
   @ 3,12 SAY [U P D A T E   L E A V E / A B S E N C E   L I
S T I N G S]
   @ 4,1 TO 4,78 DOUBLE
   * ---display detail lines
   @  7,30 SAY [1. ENTER A NEW LEAVE REQUEST FOR FY
]+STR(M_FY,2)
   @  8,30 SAY [2. CHANGE CURRENT LEAVE INFORMATION FOR FY]
    +STR(M_FY,2)
   @  9,30 SAY [3. REMOVE A LEAVE REQUEST FROM FY
]+STR(M_FY,2)
   @ 10,30 SAY [4. REVIEW LEAVES FOR FY ]+STR(M_FY,2)
   @ 12, 30 SAY '0. EXIT'
   STORE 0 TO selectnum
   @ 14,33 SAY " select     "
   @ 14,42 GET selectnum PICTURE "9" RANGE 0,4
   READ

   DO CASE
      CASE selectnum = 0
         CLEAR ALL
         RETURN

      CASE selectnum = 1
      *  DO ADD INFORMATION
         USE ABSENCE
         DO WHILE .T.
         @ 6,0 TO 9,79 DOUBLE
         @ 7,15 SAY "ENTER THE ID CODE OF THE PERSON TO ADD
THE      LEAVE REQUEST: " GET M_IDCODE PICTURE "!999"
         @ 8,15 SAY "OR PRESS RETURN TO QUIT"

         IF M_IDCODE= ""
            EXIT
         ENDIF

         USE PERSON
         LOCATE FOR IDCODE=M_IDCODE
         IF FOUND() &&PERSON DOES EXIST IN MASTER FILE
            ANSWER = " "
            MESSAGE= "IS THIS THE PERSON YOU EXPECTED? (Y/N)
"
            SET FORMAT TO CONFIRM
            READ
            IF ANSWER = "Y" &&the right person
               USE ABSENCE
               SET FILTER TO FY=M_FY
               GO TOP
               SET FORMAT TO ABSENCE
               APPEND BLANK
               REPLACE IDCODE WITH M_IDCODE
               REPLACE FY WITH M_FY
               READ
               REPLACE DURATION WITH END-START
               CLOSE FORMAT
               SET FILTER TO
               LOOP
            ELSE
               LOOP
            ENDIF
         ELSE
            @ 6,0 TO 8,79 DOUBLE
            @ 7,15 SAY "THERE IS NOT A PERSON WITH THAT
IDCODE,          PRESS RETURN TO TRY AGAIN..."
            WAIT " "
            LOOP
         ENDIF
         ENDDO

         APPEND

         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET
wait_subst
         READ
         SET CONFIRM ON

      CASE selectnum = 2
      *  DO CHANGE INFORMATION
                        DO WHILE .T.
         @ 6,0 TO 9,79 DOUBLE
         @ 7,15 SAY "ENTER THE ID CODE OF THE PERSON YOU
WANT TO      CHANGE: " GET M_IDCODE PICTURE "!999"
         @ 8,15 SAY "OR PRESS RETURN TO QUIT"

         IF M_IDCODE= ""
            EXIT
         ENDIF

         USE PERSON
         LOCATE FOR IDCODE=M_IDCODE
         IF FOUND() &&PERSON DOES EXIST IN MASTER FILE
            ANSWER = " "
            MESSAGE= "IS THIS THE PERSON YOU EXPECTED? (Y/N)
"
            SET FORMAT TO CONFIRM
            READ
            IF ANSWER = "Y" &&the right person
               USE ABSENCE
               CLEAR
               @ 6,0
               DISPLAY FIELDS IDCODE,TYPE,START,END WHILE
IDCODE=M_IDCODE
               @ 20, 0 CLEAR
               @ 22,0 SAY "ENTER THE RECORD NUMBER OF THE
LEAVE            REQUEST YOU DESIRE TO CHANGE. (1-"  +
            STR(RECCOUNT(),4)+")";
               GET RECORD PICTURE "9999"
               READ
               IF RECORD > 0 .AND. RECORD < RECCOUNT()
                  CLEAR
                  GOTO RECORD
                  SET FORMAT TO ABSENCE
                  READ
                  REPLACE DURATION WITH END-START  &&COMPUTE
# OF                 DAYS
                  CLOSE FORMAT
                  EXIT
                  ENDDO
               ELSE
                  @ 20,0 CLEAR
                  @ 23,5 SAY "NO SUCH RECORD:
"+STR(RECORD,4)
                  ? CHR(7)
                  WAIT
               ENDIF
               SET FILTER TO
               LOOP
            ELSE
               SET FILTER TO
               LOOP
            ENDIF
         ELSE
            @ 6,0 TO 8,79 DOUBLE
            @ 7,15 SAY "THERE IS NOT A PERSON WITH THAT
IDCODE,          PRESS RETURN TO TRY AGAIN..."
            WAIT " "
            LOOP
         ENDIF
         ENDDO
         SET FILTER TO

         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET
wait_subst
```

```
        READ
        SET CONFIRM ON

      CASE selectnum = 3
      *  DO REMOVE INFORMATION

         DO WHILE .T.
         @ 6,0 TO 9,79 DOUBLE
         @ 7,15 SAY "ENTER THE ID CODE OF THE PERSON TO
DELETE       THEIR LEAVE REQUEST: " GET M_IDCODE PICTURE
"!999"
         @ 8,15 SAY "OR PRESS RETURN TO QUIT"

         IF M_IDCODE= ""
            EXIT
         ENDIF

         USE PERSON
         LOCATE FOR IDCODE=M_IDCODE
         IF FOUND() &&PERSON DOES EXIST IN MASTER FILE
            ANSWER = " "
            MESSAGE= "IS THIS THE PERSON YOU EXPECTED? (Y/N)
"
            SET FORMAT TO CONFIRM
            READ
            IF ANSWER = "Y" &&the right person
               USE ABSENCE
               SET FILTER TO IDCODE=M_IDCODE .AND. FY=M_FY
               CLEAR
               @ 6,0
               DISPLAY FIELDS IDCODE,TYPE,START,END WHILE
            IDCODE=M_IDCODE
               @ 20, 0 CLEAR
               @ 22,0 SAY "ENTER THE RECORD NUMBER OF THE
LEAVE            REQUEST YOU DESIRE TO DELETE. (1-"+
            STR(RECCOUNT(),4)+")";
                     GET RECORD PICTURE "9999"
               READ
               IF RECORD > 0 .AND. RECORD < RECCOUNT()
                  GOTO RECORD
                  SET FORMAT TO DELLEAVE
                  READ
                  IF UPPER(MAYBE)= "Y"
                     DELETE
                  ENDIF
                  CLOSE FORMAT
               ELSE
                  @ 20,0 CLEAR
                  @ 23,5 SAY "NO SUCH RECORD:
"+STR(RECORD,4)
                  ? CHR(7)
                  WAIT
             ENDIF
             LOOP
        ELSE
            @ 6,0 TO 8,79 DOUBLE
            @ 7,15 SAY "THERE IS NOT A PERSON WITH THAT
IDCODE,          PRESS RETURN TO TRY AGAIN..."
            WAIT " "
            LOOP
        ENDIF
        ENDDO
        SET FILTER TO
        SET TALK ON
        CLEAR
        @ 2,0 SAY ' '
        ? 'PACKING DATABASE TO REMOVE RECORDS MARKED FOR
        DELETION'
        PACK

        SET TALK OFF
        SET CONFIRM OFF
        STORE ' ' TO wait_subst
        @ 23,0 SAY 'Press any key to continue...' GET
wait_subst
        READ
        SET CONFIRM ON

      CASE selectnum = 4
      *  DO REVIEW INFORMATION
         SELECT A
         USE ABSENCE
         INDEX ON IDCODE TO TEMP
         SELECT B
         USE PERSON
         INDEX ON IDCODE TO TEMP1
         JOIN WITH A TO TEMPJOIN FOR IDCODE=A->IDCODE FIELDS

         A->IDCODE,B->RANK,B->FNAME,;
            B->LNAME,A->TYPE,A->START,A->END,A->DURATION,;
            A->COMMENT,A->FY
         USE TEMPJOIN
         SET FILTER TO FY=M_FY
         BROWSE NOAPPEND NOMENU
         ERASE TEMP.NDX
         ERASE TEMP1.NDX
         ERASE TEMPJOIN.DBF
         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET
wait_subst
         READ
         SET CONFIRM ON
ENDCASE

ENDDO T
RETURN
* EOF: PMENU5.PRG
^Z
```

```
* Program..:
            PMENU6.PRG

* Author...: ELBERT T. SHAW & JOAN ZIMMERMAN
* Date.....: 02/02/89
* Notice...: Copyright (c) 1989, ELBERT T. SHAW & JOAN
ZIMMERMAN, All Rights Reserved
* Notes....: PRINT PERSONNEL REPORTS
SET TALK OFF
SET BELL OFF
SET ESCAPE OFF
SET CONFIRM ON
DO WHILE .T.
M_FY = 0
* Clear Screen for FY input an allow for the user to select
the Fiscal Year
* Typically, the user will only be operating in one FY
CLEAR
@6,0 to 8,79 DOUBLE
@7,15 SAY "Enter the Fiscal Year for the CME Allocations:" ;

      GET M_FY PICTURE "99"
READ

   * ---Display menu options, centered on the screen.
   *     draw menu border and print heading
   CLEAR
   @ 2, 0 TO 17,79 DOUBLE
   @ 3,21 SAY [P R I N T   R E P O P T S   F O R
]+STR(M_FY,2)
   @ 4,1 TO 4,78 DOUBLE
   * ---display detail lines
   @  7,24 SAY [1. Position Listing]
   @  8,24 SAY [2. Section Update Worksheet]
   @  9,24 SAY [3. Loss Report]
   @ 10,24 SAY [4. Vacancy Listing]
   @ 11,24 SAY [5. Social Roster]
   @ 12,24 SAY [7. Monthly Absence Report]
   @ 13,24 SAY [8. Doctor Fiscal Year Absence Summary]
   @ 15, 24 SAY '0. EXIT'
   STORE 0 TO selectnum
   @ 17,33 SAY " select      "
   @ 17,42 GET selectnum PICTURE "9" RANGE 0,8
   READ

   DO CASE
      CASE selectnum = 0
         CLEAR ALL
         RETURN

      CASE selectnum = 1
      *  DO Position Listing


         *JOIN APC WITH TDA TO TEMPJOIN
         *JOIN TEMPJOIN WITH PERSON FOR LIKE TDA INFORMATION
         *SORT BY TDA POSITION INFORMATION
         *SUBTOTAL AUTH ON CHANGE OF TDA_PARA
         *COUNT NUMBER OF RECORDS IN EACH PARAGRAPH TO GET
            ASSIGNED
         *POSITION LISTING REPORT PRINTED HERE
         *ERASE ALL TEMP FILES

         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET
wait_subst
         READ
         SET CONFIRM ON

      CASE selectnum = 2
      *  DO Section Update Listings


         *JOIN APC WITH TDA TO TEMPJOIN
         *JOIN TEMPJOIN WITH PERSON FOR LIKE TDA INFORMATION
         *SORT BY TDA POSITION INFORMATION
         *SUBTOTAL AUTH ON CHANGE OF TDA_PARA
         *COUNT NUMBER OF RECORDS IN EACH PARAGRAPH TO GET
```

```
ASSIGNED
         *SORT BY SECTION CODE TO GET SECTION BREAKOUTS,
        SECONDARY SORT BY TDA INFORMATION
         *INCLUDE BLANK CHANGE FIELDS, SEE EXAMPLE REPORT
         *SECTION UPDATE WORKSHEET REPORT PRINTED HERE
         *ERASE ALL TEMP FILES
         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET
wait_subst
         READ
         SET CONFIRM ON

      CASE selectnum = 3
      *  DO Loss Report

         StartDate
         STORE SPACE(8) TO StartDate,EndDate
         CLEAR
         @6,0 to 9,79 DOUBLE
         @7,15 SAY "Enter the start date:" ;
               GET StartDate PICTURE "99/99/99"
         @ 8,15 SAY "Enter the ending date:";
               GET EndDate PICTURE "99/99/99"
         READ
         STORE CTOD(Startdate) TO StartDate
         STORE CTOD(EndDate) TO EndDate
         *JOIN TDA WITH PERSON TO TEMPJOIN FOR SAME TDA
POSITION
         *FIELDS
RANK,LNAME,FNAME,JOBTITLE,ALOSS,TDA_PARA,LINE,AND POSN
         *USE TEMPJOIN &&LIST OF ALL PERSONS WITH THEIR
JOBTITLE
         *INDEX ON ALOSS
         *SEEK STARTDATE
         *---DECIDE WHETHER TO PROCEED WITH SEEK APPROACH
         *---OR REVERT TO SLOWER, SAFER FOR APPROACH
         *IF FOUND()
         *   LIST WHILE ALOSS <= STARTDATE
         *       IF POSN=99
         *          USE TDA
         *          LOCATE TDA_PARA .AND. TDA_LINE
         *          PRINT JOBTITLE
         *       ENDIF
         *ELSE
         *   LIST FOR ALOSS >= STARTDATE .AND. ALOSS <=
ENDDATE
         *       IF POSN=99
         *          USE TDA
         *          LOCATE TDA_PARA .AND. TDA_LINE
         *          PRINT JOBTITLE
         *       ENDIF
         *ENDIF
         *LOSS REPORT PRINTED HERE
         *ERASE ALL TEMP FILES
         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET
wait_subst
         READ
         SET CONFIRM ON

      CASE selectnum = 4
      *  DO Vacancy Listing

         *BLANK = " "

         *JOIN APC WITH TDA TO TEMPJOIN
         *JOIN PERSON WITH TEMPJOIN FOR LIKE TDA
INFORMATION, IF NO        PERSON
         *   MATCHES A TDAPOSITION, LEAVE IDCODE AND LNAME
BLANK
         *SORT BY TDA POSITION INFORMATION
         *COUNT FOR LNAME = BLANK .AND. IDCODE = BLANK TO
        TOTAL_VACANT
         *SET FILTER TO IDCODE=BLANK .AND. LNAME=BLANK
         *   THIS SHOULD ONLY DISPLAY THE VACANT TDA
POSITIONS
         *VACANCY REPORT PRINTED HERE
         *ERASE ALL TEMP FILES
         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET
wait_subst
         READ
         SET CONFIRM ON

      CASE selectnum = 5
      *  DO Social Roster

         *JOIN PRIVATE WITH PERSON TO SOCIAL FOR IDCODE
         *SOCIAL ROSTER PRINTED HERE
         *ERASE ALL TEMP FILES
         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET
wait_subst
         READ
         SET CONFIRM ON

      CASE selectnum = 6
      *  DO MONTHLY ABSENCE REPORT

         MONTH = 0
         @ 8,15 SAY "ENTER MONTH (i.e. 1-12) FOR THE
REPORT:";
               GET MONTH  PICTURE "99 " RANGE 1,12
         READ
         *USE ABSENCE
         *COPY TO TEMPFILE FIELDS
IDCODE,START,END,DURATION,FY,TYPE
         *USE CMEREQ
         *COPY TO APPENDFILE FIELDS
         IDCODE,START,END,DURATION,FY,TYPE
         *USE TEMPFILE
         *APPEND FROM APPENDFILE  && JOIN CME AND LEAVE
FILES
         *SORT BY "START" DATE, "END" DATE
         *JOIN PERSON WITH TEMPFILE TO WHOFILE && JOINS
NAMES       WITH IDCODE
         *USE WHOFILE
         *SET FILTER TO FY=M_FY
         *DISPLAY WHILE [MONTH OF END DATE] = MONTH .OR.
[MONTH      OF START DATE] = MONTH
         *MONTHLY ABSENCE REPORT PRINTED HERE
         *ERASE ALL TEMP FILES
         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET
wait_subst
         READ
         SET CONFIRM ON

      CASE selectnum = 7
      *  DO DOCTOR ABSENCE REPORT
         M_FY = 0
         CLEAR
         @6,0 to 8,79 DOUBLE
         @7,15 SAY "Enter the Fiscal Year for the ABSENCE
REPORT:" ;
               GET M_FY PICTURE "99"
         READ
         *USE ABSENCE
         *COPY TO TEMPFILE FIELDS
IDCODE,START,END,DURATION,FY,TYPE            *USE CMEREQ
         *COPY TO APPENDFILE FIELDS
         IDCODE,START,END,DURATION,FY,TYPE
         *USE TEMPFILE
         *APPEND FROM APPENDFILE  && JOIN CME AND LEAVE
FILES
         *SORT BY "START" DATE, "END" DATE
         *JOIN PERSON WITH TEMPFILE TO WHOFILE && JOINS
NAMES       WITH IDCODE
         *USE WHOFILE
         *SET FILTER TO FY=M_FY
         *INDEX ON IDCODE
         *AVERAGE DURATION TO AVGDURATION
         *TOTAL ON IDCODE TO TOTALSUM FIELDS DURATION  &&GET
         TOTAL OF ALL ABSENCES
         *ABSENCE SUMMARY REPORT PRINTED HERE, PROCEDURE
LISTED      BELOW
         *DO WHILE .NOT. EOF() && SEE ABSENCE SUMMARY REPORT
         *    IF IDCODE HAS CHANGED FROM PREVIOUS IDCODE
         *       USE TOTALSUM
         *       LOCATE CURRENTIDCODE
         *       PRINT "TOTAL DAYS ABSENT"+STR(DURATION,3)
         *    ENDIF
         *    DISPLAY CURRENT RECORD
         *    SKIP TO NEXT RECORD
         *ENDDO
         *ERASE ALL TEMP FILES
         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET
wait_subst
         READ
         SET CONFIRM ON

ENDCASE
ENDDO T
RETURN
* EOF: PMENU6.PRG
^Z
```

APPENDIX F. SATISFACTION PROGRAMS

TABLE OF PROGRAMS

SMENU.PRG
SMENU2.PRG
SMENU2_1.PRG
SMENU2_2.PRG
SMENU2_3.PRG

DISCLAIMER

The purpose of this programming code is to facilitate the understanding of the requirements presented in Chapter 5 of this thesis. The nature of this project precludes it actual implementation in DBASE III+. To fully implement the requirements the system designer will need a full range of capabilities that does not currently exist in DBASE III+.

DBASE III+ served as the modeling tool by which the screens were generated and where necessary, specific code was written to illustrate a point. The actual working code merely acts as a shell in which to run the menus. A close analysis of the program code can facilitate implementation in a more suitable language, i.e., PARADOX, which can support the graphics and high level relationships involved in the various databases. Where the actual requirements process may appear to be unclear, comments were added within the code to explain these areas to the designer.

```
* Program..:
            SMENU.PRG

* Author...: JOAN ZIMMERMAN & ELBERT SHAW
* Date.....: 02/19/89
* Notice...: Copyright (c) 1989, All Rights Reserved
* Notes....: Survey Main Menu Program

SET TALK OFF
SET BELL OFF
SET STATUS OFF
SET ESCAPE OFF
SET CONFIRM ON
USE SURVEY
DO WHILE .T.

   * ---Display menu options, centered on the screen.
   *    draw menu border and print heading
   CLEAR
   @ 2, 0 TO 12,79 DOUBLE
   @ 3,10 SAY [DEPARTMENT OF FAMILY PRACTICE PATIENT OPINION
    SYSTEM]
   @ 4,1 TO 4,78 DOUBLE
   * ---display detail lines
   @  7,28 SAY [1. ENTER NEW SURVEY DATA]
   @  8,28 SAY [2. PRINT OPINION RESULTS]
   @ 10, 28 SAY '0. EXIT'
   STORE 0 TO selectnum
   @ 12,33 SAY " select     "
   @ 12,42 GET selectnum PICTURE "9" RANGE 0,2
   READ

   DO CASE
      CASE selectnum = 0
         SET BELL ON
         SET TALK ON
         CLEAR ALL
         RETURN

      CASE selectnum = 1
      *  DO ENTER NEW SURVEY DATA

         SET FORMAT TO SURVEY
         APPEND
         CLOSE FORMAT
                                  SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET
wait_subst
         READ
         SET CONFIRM ON

      CASE selectnum = 2
      *  DO PRINT OPINION RESULTS

         DO SMENU2

         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET
wait_subst
         READ
         SET CONFIRM ON
ENDCASE

ENDDO T
RETURN
* EOF: SMENU.PRG
^Z
```

```
* Program..:
            SMENU2.PRG

* Author...: JOAN ZIMMERMAN & ELBERT SHAW
* Date.....: 02/19/89
* Notice...: Copyright (c) 1989, All Rights Reserved
* Notes....: Print Opinion Results

SET TALK OFF
SET BELL OFF
SET STATUS OFF
SET ESCAPE OFF
SET CONFIRM ON
USE SURVEY

DO WHILE .T.

   * ---Display menu options, centered on the screen.
   *    draw menu border and print heading
   CLEAR
   @ 2, 0 TO 15,79 DOUBLE
   @ 3,21 SAY [P R I N T   O F I N I O N   R E S U L T S]
   @ 4,1 TO 4,78 DOUBLE
   * ---display detail lines
   @  7,29 SAY [1. ACCESS TO CARE REPORTS]
   @  8,29 SAY [2. WAITING TIME REPORTS]
   @  9,29 SAY [3. SATISFACTION REPORTS]
   @ 10,29 SAY [4. DOCTOR REPORTS]
   @ 11,29 SAY [5. PATIENT COMMENTS]
   @ 13, 29 SAY '0. EXIT'
   STORE 0 TO selectnum
   @ 15,33 SAY " select     "
   @ 15,42 GET selectnum PICTURE "9" RANGE 0,5
   READ

   DO CASE
      CASE selectnum = 0
         RETURN

      CASE selectnum = 1
      *  DO ACCESS TO CARE REPORTS

         DO SMENU2_1

         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET
wait_subst
         READ
```

```
         SET CONFIRM ON

      CASE selectnum = 2
      *  DO WAITING TIME REPORTS

         DO SMENU2_2

         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET
wait_subst
         READ
         SET CONFIRM ON

      CASE selectnum = 3
      *  DO SATISFACTION REPORTS

         DO SMENU2_3

         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET
wait_subst
         READ
         SET CONFIRM ON

      CASE selectnum = 4
      *  DO DOCTOR REPORTS


         CLEAR
         M_YR=0
         M_MO=0
         @6,0 TO 9,79 DOUBLE
         @7,15 SAY "Enter the Year for report:";
               GET M_YR PICTURE "99"
         READ
         @8,15 SAY "Enter the Month for report:";
            GET M_MO PICTURE "99" RANGE 1,12
         READ

       ***** Print Doctor Satisfaction Indicator Report
here *****

         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET
wait_subst
         READ
         SET CONFIRM ON

      CASE selectnum = 5
      *  DO PATIENT COMMENTS
         CLEAR
         M_MO = 0
         M_YR = 0
         @6,0 TO 9,79 DOUBLE
         @7,15 SAY "Enter the Year:";
                GET M_YR PICTURE "99"
         READ
         @8,15 SAY "Enter the Month for the desired
comments:";
                GET M_MO PICTURE "99" RANGE 1,12
         READ
         CLEAR
         REPORT FORM PATCOMM FOR YEAR=M_YR .AND. MONTH=M_MO
        .AND. PATCOMMENTS = "Y"
         @22,0
         WAIT
ENDCASE

ENDDO T
RETURN
* EOF: SMENU2.PRG
^Z
```

```
* Program..:
             SMENU2_1.PRG

* Author...: JOAN ZIMMERMAN & ELBERT SHAW
* Date.....: 02/19/89
* Notice...: Copyright (c) 1989 All Rights Reserved
* Notes....: Access to Care Reports

SET TALK OFF
SET BELL OFF
SET STATUS OFF
SET ESCAPE OFF
SET CONFIRM ON

DO WHILE .T.

   * ---Display menu options, centered on the screen.
   *    drew menu border and print heading
   CLEAR
   @ 2, 0 TO 12,79 DOUBLE
   @ 3,19 SAY [A C C E S S   T O   C A R E   R E P O R T S]

   @ 4,1 TO 4,78 DOUBLE
   * ---display detail lines
   @  7,32 SAY [1. DEPARTMENT REPORT]
   @  8,32 SAY [2. CLINIC REPORT]
   @ 10, 32 SAY '0. EXIT'
   STORE 0 TO selectnum
   @ 12,33 SAY " select      "
   @ 12,42 GET selectnum PICTURE "9" RANGE 0,2
   READ

   DO CASE
      CASE selectnum = 0
         RETURN

      CASE selectnum = 1
      *  DO DEPARTMENT REPORTS


         CLEAR
         M_YR=0
         M_MO=0
         @6,0 TO 9,79 DOUBLE
         @7,15 SAY "Enter the Year for report:";
               GET M_YR PICTURE "99"
         READ
         @8,15 SAY "Enter the Month for report:";
            GET M_MO PICTURE "99" RANGE 1,12
         READ

        ***** Print Dept. Access to Care Report here *****


         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET
wait_subst
         READ
         SET CONFIRM ON

      CASE selectnum = 2
      *  DO CLINIC REPORTS

         CLEAR
         M_YR=0
         M_MO=0
         @6,0 TO 9,79 DOUBLE
         @7,15 SAY "Enter the Year for report:";
               GET M_YR PICTURE "99"
         READ
         @8,15 SAY "Enter the Month for report:";
            GET M_MO PICTURE "99" RANGE 1,12
         READ
         CLEAR
         M_CLINIC = "    "
         @6,0 TO 8,79 DOUBLE
         @7,15 SAY "Enter the Clinic section code for
report:";
               GET M_CLINIC PICTURE "@!AAA"
         READ

       ***** Print Clinic Access to care report here *****


         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET
wait_subst
         READ
         SET CONFIRM ON
ENDCASE

ENDDO T
RETURN
* EOF: SMENU2_1.PRG
^Z
```

```
* Program..:
             SMENU2_2.PRG

* Author...: JOAN ZIMMERMAN & ELBERT SHAW
* Date.....: 02/19/89
* Notice...: Copyright (c) 1989, All Rights Reserved
* Notes....: Waiting Time Reports

SET TALK OFF
```

```
SET BELL OFF
SET STATUS Off
SET ESCAPE OFF
SET CONFIRM ON

DO WHILE .T.

   * ---Display menu options, centered on the screen.
   *    draw menu border and print heading
   CLEAR
   @ 2, 0 TO 12,79 DOUBLE
   @ 3,21 SAY [W A I T I N G   T I M E   R E P O R T S]
   @ 4,1 TO 4,78 DOUBLE
   * ---display detail lines
   @  7,32 SAY [1. DEPARTMENT REPORT]
   @  8,32 SAY [2. CLINIC REPORT]
   @ 10, 32 SAY '0. EXIT'
   STORE 0 TO selectnum
   @ 12,33 SAY " select      "
   @ 12,42 GET selectnum PICTURE "9" RANGE 0,2
   READ

   DO CASE
      CASE selectnum = 0
         RETURN

      CASE selectnum = 1
      *  DO DEPARTMENT REPORTS


         CLEAR
         M_YR=0
         M_MO=0
         @6,0 TO 9,79 DOUBLE
         @7,15 SAY "Enter the Year for report:";
               GET M_YR PICTURE "99"
         READ
         @8,15 SAY "Enter the Month for report:";
            GET M_MO PICTURE "99" RANGE 1,12
         READ

       ***** Print Dept. Waiting Time Report here *****

         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET
wait_subst
         READ
         SET CONFIRM ON

      CASE selectnum = 2
      *  DO CLINIC REPORTS

         CLEAR
         M_YR=0
         M_MO=0
         @6,0 TO 9,79 DOUBLE
         @7,15 SAY "Enter the Year for report:";
               GET M_YR PICTURE "99"
         READ
         @8,15 SAY "Enter the Month for report:";
            GET M_MO PICTURE "99" RANGE 1,12
         READ

         CLEAR
         M_CLINIC = "   "
         @6,0 TO 8,79 DOUBLE
         @7,15 SAY "Enter the Clinic section code for
report:";
            GET M_CLINIC PICTURE "@!AAA"
         READ

        ***** Print Clinic Waiting Time Report here *****


         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET
wait_subst
         READ
         SET CONFIRM ON
ENDCASE

ENDDO T
RETURN
* EOF: SMENU2_2.PRG
^Z^Z
```

[redacted]

```
* Program..:
            SMENU2_3.PRG
* Author...: JOAN ZIMMERMAN & ELBERT SHAW
* Date.....: 02/19/89
* Notice...: Copyright (c) 1989, All Rights Reserved
* Notes....: Satisfaction Reports

SET TALK OFF
SET BELL OFF
SET STATUS Off
SET ESCAPE OFF
SET CONFIRM ON

DO WHILE .T.

   * ---Display menu options, centered on the screen.
   *    draw menu border and print heading
   CLEAR
   @ 2, 0 TO 12,79 DOUBLE
   @ 3,21 SAY [S A T I S F A C T I O N   R E P O R T S]
   @ 4,1 TO 4,78 DOUBLE
   * ---display detail lines
   @  7,32 SAY [1. DEPARTMENT REPORT]
   @  8,32 SAY [2. CLINIC REPORT]
   @ 10, 32 SAY '0. EXIT'
   STORE 0 TO selectnum
   @ 12,33 SAY " select      "
   @ 12,42 GET selectnum PICTURE "9" RANGE 0,2
   READ

   DO CASE
      CASE selectnum = 0
         RETURN

      CASE selectnum = 1
      *  DO DEPARTMENT REPORTS

         CLEAR
         M_YR=0
         M_MO=0
         @6,0 TO 9,79 DOUBLE
         @7,15 SAY "Enter the Year for report:";
               GET M_YR PICTURE "99"
         READ
         @8,15 SAY "Enter the Month for report:";
            GET M_MO PICTURE "99" RANGE 1,12
         READ

        ***** Print Dept. satisfaction Report here *****


         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET
wait_subst
         READ
         SET CONFIRM ON

      CASE selectnum = 2
      *  DO CLINIC REPORTS

         CLEAR
         M_YR=0
         M_MO=0
         @6,0 TO 9,79 DOUBLE
         @7,15 SAY "Enter the Year for report:";
               GET M_YR PICTURE "99"
         READ
         @8,15 SAY "Enter the Month for report:";
            GET M_MO PICTURE "99" RANGE 1,12
         READ
         CLEAR
         M_CLINIC = "   "
         @6,0 TO 8,79 DOUBLE
         @7,15 SAY "Enter the Clinic section code for
report:";
            GET M_CLINIC PICTURE "@!AAA"
         READ

       ***** Print Clinic satisfaction report here *****

         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET
wait_subst
         READ
         SET CONFIRM ON
ENDCASE

ENDDO T
RETURN
* EOF: SMENU2_3.PRG
^Z
```

APPENDIX G. PRODUCTIVITY PROGRAMS

TABLE OF PROGRAMS

VMENU.PRG
VMENU1.PRG
VMENU1_1.PRG
VMENU2.PRG
VMENU3.PRG

DISCLAIMER

The purpose of this programming code is to facilitate the understanding of the requirements presented in Chapter 5 of this thesis. The nature of this project precludes it actual implementation in DBASE III+. To fully implement the requirements the system designer will need a full range of capabilities that does not currently exist in DBASE III+.

DBASE III+ served as the modeling tool by which the screens were generated and where necessary, specific code was written to illustrate a point. The actual working code merely acts as a shell in which to run the menus. A close analysis of the program code can facilitate implementation in a more suitable language, i.e., PARADOX, which can support the graphics and high level relationships involved in the various databases. Where the actual requirements process may appear to be unclear, comments were added within the code to explain these areas to the designer.

```
* Program..:
            VMENU.PRG

* Author...: JOAN ZIMMERMAN/ELBERT SHAW
* Date.....: 02/23/89
* Notice...: Copyright (c) 1989, All Rights Reserved
SET TALK OFF
SET BELL OFF
SET STATUS OFF
SET ESCAPE OFF
SET CONFIRM ON

DO WHILE .T.

   * ---Display menu options, centered on the screen.
   *    draw menu border and print heading
   CLEAR
   @ 2, 0 TO 13,79 DOUBLE
   @ 3,13 SAY [DEPARTMENT OF FAMILY PRACTICE PRODUCTIVITY
    SYSTEM]
   @ 4,1 TO 4,78 DOUBLE
   * ---display detail lines
   @  7,25 SAY [1. UPDATE VISIT FILE]
   @  8,25 SAY [2. DEPT & CLINIC PRODUCTIVITY]
   @  9,25 SAY [3. EXPENDITURE/VISIT COMPARISON]
   @ 11, 25 SAY '0. EXIT'
   STORE 0 TO selectnum
   @ 13,33 SAY " select     "
   @ 13,42 GET selectnum PICTURE "9" RANGE 0,3
   READ

   DO CASE
      CASE selectnum = 0
         SET BELL ON
         SET TALK ON
         CLEAR ALL
         RETURN

      CASE selectnum = 1
      *  DO UPDATE VISIT FILE

         DO VMENU1

         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET
wait_subst
         READ
         SET CONFIRM ON

      CASE selectnum = 2
      *  DO DEPT & CLINIC PRODUCTIVITY

         DO VMENU2

         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET
wait_subst
         READ
         SET CONFIRM ON

      CASE selectnum = 3
      *  DO EXPENDITURE/VISIT COMPARISON

         DO VMENU3

         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET
wait_subst
         READ
         SET CONFIRM ON
ENDCASE

ENDDO T
RETURN
* EOF: VMENU.PRG
^Z
```

```
* Program..:
            VMENU1.PRG

* Author...: JOAN ZIMMERMAN/ELBERT SHAW
* Date.....: 02/23/89
* Notice...: Copyright (c) 1989, All Rights Reserved
* Notes....:
SET TALK OFF
SET BELL OFF
SET STATUS OFF
SET ESCAPE OFF
SET CONFIRM ON

DO WHILE .T.

   * ---Display menu options, centered on the screen.
   *    draw menu border and print heading
   CLEAR
   @ 2, 0 TO 12,79 DOUBLE
   @ 3,24 SAY [U P D A T E   V I S I T   F I L E]
   @ 4,1 TO 4,78 DOUBLE
   * ---display detail lines
   @  7,21 SAY [1. UPDATE VISIT DATA*]
   @  8,21 SAY [2. EXTRACT VISIT DATA FROM MED302 FILE]
   @ 10, 21 SAY '0. EXIT'
   STORE 0 TO selectnum
   @ 12,33 SAY " select     "
   @ 12,42 GET selectnum PICTURE "9" RANGE 0,2
   @ 16,15 SAY "* This option allows you to enter visit"
   @ 17,15 SAY "  data from the keyboard."
   READ
   DO CASE
      CASE selectnum = 0
         RETURN

      CASE selectnum = 1
      *  DO ENTER VISIT DATA

         DO VMENU1_1
         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET
```

```
wait_subst
         READ
         SET CONFIRM ON

      CASE selectnum = 2
      *  DO EXTRACT VISIT DATA FROM MED302 FILE


       *****  Program to extract visit data from med302 to
file *****

         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET
wait_subst
         READ
         SET CONFIRM ON
ENDCASE

ENDDO T
RETURN
* EOF: VMENU1.PRG
^Z
```

```
* Program..:
             VMENU1_1.PRG

* Author...: JOAN ZIMMERMAN/ELBERT SHAW
* Date.....: 02/23/89
* Notice...: Copyright (c) 1989 All Rights Reserved
SET TALK OFF
SET BELL OFF
SET STATUS OFF
SET ESCAPE OFF
SET CONFIRM ON
USE VISIT

DO WHILE .T.

   * ---Display menu options, centered on the screen.
   *    draw menu border and print heading
   CLEAR
   @ 2, 0 TO 14,79 DOUBLE
   @ 3,24 SAY [U P D A T E   V I S I T   D A T A]
   @ 4,1 TO 4,78 DOUBLE
   * ---display detail lines
   @  7,30 SAY [1. ADD VISIT DATA]
   @  8,30 SAY [2. CHANGE VISIT DATA]
   @  9,30 SAY [3. REMOVE VISIT DATA]
   @ 10,30 SAY [4. REVIEW VISIT DATA]
   @ 12, 30 SAY '0. EXIT'
   STORE 0 TO selectnum
   @ 14,33 SAY " select     "
   @ 14,42 GET selectnum PICTURE "9" RANGE 0,4
   READ

   DO CASE
      CASE selectnum = 0
         RETURN

      CASE selectnum = 1
      *  DO ADD INFORMATION

         SET FORMAT TO VISIT
         APPEND

         SET FORMAT TO
         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET
wait_subst
         READ
         SET CONFIRM ON

      CASE selectnum = 2
      *  DO CHANGE INFORMATION

         SET FORMAT TO VISIT
         EDIT

         SET FORMAT TO
         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET
wait_subst
         READ
         SET CONFIRM ON

      CASE selectnum = 3
      *  DO REMOVE INFORMATION

         SET TALK ON

         CLEAR
         @ 2,0 SAY ' '
         ? 'PACKING DATABASE TO REMOVE RECORDS MARKED FOR
         DELETION'
         PACK

         SET TALK OFF
         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET
wait_subst
         READ
         SET CONFIRM ON

      CASE selectnum = 4
      *  DO REVIEW INFORMATION

         BROWSE NOMENU NOAPPEND
         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET
wait_subst
         READ
         SET CONFIRM ON
ENDCASE

ENDDO T
RETURN
* EOF: VMENU1_1.PRG
^Z^Z
```

```
* Program..:
             VMENU2.PRG

* Author...: JOAN ZIMMERMAN/ELBERT SHAW
* Date.....: 02/23/89
* Notice...: Copyright (c) 1989 All Rights Reserved
SET TALK OFF
SET BELL OFF
SET STATUS OFF
SET ESCAPE OFF
SET CONFIRM ON

DO WHILE .T.

   * ---Display menu options, centered on the screen.
   *    draw menu border and print heading
   CLEAR
   @ 2, 0 TO 12,79 DOUBLE
   @ 3,15 SAY [D E P T   &   C L I N I C   P R O D U C T I V
I T Y]
   @ 4,1 TO 4,78 DOUBLE
   * ---display detail lines
   @  7,26 SAY [1. TOTAL MONTH VISITS]
   @  8,26 SAY [2. CLINIC & DEPT VISIT TRENDS]
   @ 10, 26 SAY '0. EXIT'
   STORE 0 TO selectnum
   @ 12,33 SAY " select     "
   @ 12,42 GET selectnum PICTURE "9" RANGE 0,2
   READ

   DO CASE
      CASE selectnum = 0
         RETURN

      CASE selectnum = 1
      *  DO TOTAL MONTH VISITS

         CLEAR
         M_MO=0
         M_YR=0
         @6,0 TO 9,79 DOUBLE
         @7,15 SAY "Enter the year for report";
               GET M_YR PICTURE "99"
         READ
         @8,15 SAY "Enter the month for report";
               GET M_MO PICTURE "99"
         READ

       ***** TOTAL MONTHs VISIT BAR GRAPH HERE *****

         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET
wait_subst
         READ
         SET CONFIRM ON

      CASE selectnum = 2
      *  DO CLINIC & DEPT VISIT TRENDS

         CLEAR
```

```
         M_MO=0
         @6,0 TO 8,79 DOUBLE
         @7,15 SAY "Enter the year for report";
               GET M_YR PICTURE "99"
         READ

       *****  CLINIC & DEPT VISIT TREND GRAPH HERE *****

         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET
wait_subst
         READ
         SET CONFIRM ON
ENDCASE

ENDDO T
RETURN
* EOF: VMENU2.PRG
^Z
```

```
* Program..:
            VMENU3.PRG

* Author...: JOAN ZIMMERMAN/ELBERT SHAW
* Date.....: 02/23/89
* Notice...: Copyright (c) 1989, All Rights Reserved
SET TALK OFF
SET BELL OFF
SET STATUS OFF
SET ESCAPE OFF
SET CONFIRM ON

DO WHILE .T.

   * ---Display menu options, centered on the screen.
   *    draw menu border and print heading
   CLEAR
   @ 2, 0 TO 12,79 DOUBLE
   @ 3,13 SAY [E X P E N D I T U R E / V I S I T   C O M P A
R I S O N]
   @ 4,1 TO 4,78 DOUBLE
   * ---display detail lines
   @  7,28 SAY [1. CLINIC EXPENDITURE PER VISIT REPORT]
   @  8,28 SAY [2. DEPT. EXPENDITURE VS VISIT TREND REPORT]

   @ 10, 28 SAY '0. EXIT'
   STORE 0 TO selectnum
   @ 12,33 SAY " select     "
   @ 12,42 GET selectnum PICTURE "9" RANGE 0,2
   READ

   DO CASE
      CASE selectnum = 0
         RETURN

      CASE selectnum = 1
      *  DO CLINIC EXPEND. PER VISIT

         CLEAR
         M_MO=0
         M_YR=0
         @6,0 TO 9,79 DOUBLE
         @7,15 SAY "Enter the year for report";
               GET M_YR PICTURE "99"
         READ
         @8,15 SAY "Enter the month for report";
                GET M_MO PICTURE "99"
         READ

        ***** Print Clinic months exp/visit report here
*****

         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET
wait_subst
         READ
         SET CONFIRM ON

      CASE selectnum = 2
      *  DO EXPEND. VS VISIT TREND
         CLEAR
         M_YR=0
         @6,0 TO 8,79 DOUBLE
         @7,15 SAY "Enter the year for report";
               GET M_YR PICTURE "99"
         READ

        ***** Print Dept EXP VS VISIT TREND REPORT HERE
*****
         SET CONFIRM OFF
         STORE ' ' TO wait_subst
         @ 23,0 SAY 'Press any key to continue...' GET
wait_subst
         READ
         SET CONFIRM ON
ENDCASE

ENDDO T
RETURN
* EOF: VMENU1.PRG
^Z
```

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